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Apple offers long-awaited System 7 OS

By Caryn Gillooly
Senior Editor

CUPERTINO, Calif. — Apple Computer, Inc. next week will formally announce its much anticipated multitasking System 7.0 Macintosh operating system, a product that provides inherent support for peer-to-peer networking.

But even before its formal arrival, users and analysts are panning the product, which took more than three years to develop. One analyst complained that the offering does not give Macintosh users the sophisticated networking capabilities they had expected.

"There are very few networking features of any interest," said the analyst, who requested anonymity. "I was disappointed. I was told [Apple] was making some grand networking announcements, but we got the impression they just haven't thought through the networking aspects."

Primary networking features of the new system software include multitasking capabilities and peer-to-peer file sharing.

The multitasking capabilities let users open and run several programs simultaneously. This,

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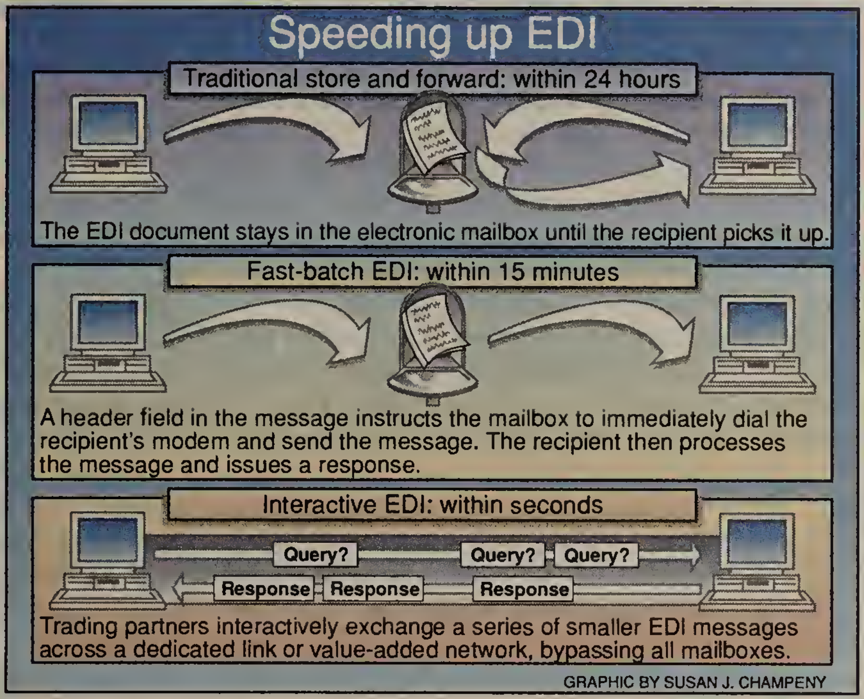
Speeding up EDI
Traditional store and forward: within 24 hours
Fast-batch EDI: within 15 minutes
Interactive EDI: within seconds
Query?
Query?
Query?
Response
Response
Response

The EDI document stays in the electronic mailbox until the recipient picks it up.

A header field in the message instructs the mailbox to immediately dial the recipient's modem and send the message. The recipient then processes the message and issues a response.

Trading partners interactively exchange a series of smaller EDI messages across a dedicated link or value-added network, bypassing all mailboxes.

GRAPHIC BY SUSAN J. CHAMPENY

Pioneering users moving to faster methods of EDI

Seek to overcome limits of store-and-forward EDI.

By Wayne Eckerson
Senior Editor

To respond more quickly to market opportunities and meet just-in-time requirements, a growing number of users are moving from traditional store-and-forward EDI to faster methods of exchanging electronic documents.

Companies are adopting two new flavors of electronic data interchange — fast-batch EDI and interactive EDI. Fast-batch EDI essentially speeds up the store-and-forward process by sending messages through electronic mailboxes on value-added networks (VAN) directly into a recipient's computer system.

Interactive EDI typically involves establishing a two-way link that enables trading partners to rapidly exchange records or fields within an EDI message rather than the entire message.

There has been a ground swell of interest in fast-batch and interactive EDI in a number of industries — including the airlines, natural gas, manufacturing, pharmaceuticals and financial services — where traditional EDI

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Bytex bases LAN hub on matrix platform

Firm enters hub market with high-end token-ring hub device based on cross-connect technology.

By Jim Brown
Senior Editor

SOUTHBOROUGH, Mass. — Bytex Corp. this week will introduce its first LAN hub, a high-end device based on a cross-connect switching architecture that lets central-site operators reconfigure nets without moving cables.

The hub, part of the Maestro system, brings to the local-area network hub market many of the features and functions of Bytex's high-end matrix switches, which are used to switch incoming lines between front-end processors in data centers. Each hub supports connection of as many as 144 LAN devices.

Bytex's cross-connect architecture enables users to support as many as 32 logical 4M or 16M bit/sec token rings with each hub by creating software tables defining which ports are on each ring. Networks can be reconfigured by modifying the tables.

At the heart of the Maestro system is an Intelligent Switching Hub that provides connections between devices and the Maestro Network Management System, which monitors and controls the hubs. As many as 32 hubs can be daisy-chained to form a Maestro Control Network supporting more than 4,000 devices. That net can be managed from a single workstation, but the hubs must be within half a mile of each other.

Bytex is also offering a Maestro Ring Monitor board that plugs into the hub chassis and forwards token-ring error conditions and performance data to the management workstation.

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NETLINE

IBM'S RISC SYSTEM/6000 gets wider role in vendor's net management strategy. Page 2.

NETWORKED IMAGE systems save money, boost productivity, users say. Page 3.

KENTUCKY PUTS OUT RFP for an integrated statewide backbone. Page 3.

USERS ASK FCC for assistance in battling toll fraud. Page 3.

DUN & BRADSTREET prepares for the coming of 1992 with the cutover of a new European net. Page 6.

DEC UNWRAPS low-end 64K bit/sec DECnet router. Page 6.

MCI VISION, VNET callers can use their calling cards to reach the U.S. from overseas. Page 6.

NEWSPAPER

LAN hub vendors rush to bolster management tools

By Bob Brown
Senior Editor

Craig Benson, chairman and chief executive officer of Cabletron Systems, Inc., says his company made a make-or-break decision in 1988 to spend $12 million building a state-of-the-art integrated net management system.

With more users relying on intelligent wiring hubs to anchor expanding local-area networks, hub hardware becoming something of a commodity and major systems vendors threatening to enter the market, Cabletron officials believed the company had to have a strong network management system in order to survive.

In September 1990, Cabletron unveiled its Unix-based Spectrum net management system, which became generally available last month. But the company wasn't alone in realizing the growing importance of hub network management capabilities.

SynOptics Communications, Inc., which holds the biggest share of the $555 million hub market, as well as Ungermann-Bass, Inc. and Chipcom Corp. have also made major net management announcements in recent months.

The moves have been welcomed by users.

"When we installed our first hub in 1989, we did so to consolidate our local networks," said Joe Zarrehparvar, network engineer-

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FEATURE

DATACOM
BUYER'S GUIDE

Packet switching speeds up

By Edwin Mier
Special to Network World

Packet switching is as vital a transmission technology today as it was when it first emerged in the U.S. government's Advanced Research Projects Agency Network in the early 1970s. But it's changing.

Frame relay, a faster packet technology, is challenging the existing X.25 packet-switching standard. There are indications that frame relay can provide as much as a tenfold increase in user data throughput compared with X.25.

Some of the newer packet switches are able to combine X.25 and frame relay, which allows frame relay traffic to travel alongside X.25 over the same backbone. This Buyer's Guide to nodal X.25 packet

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PacBell to test EDI-based service for billing users

Electronic billing expected to ease processing, data entry woes for carrier's large customers.

By Jim Brown
Senior Editor

SAN FRANCISCO — Pacific Bell has launched a six-month project in which it will use electronic data interchange to send telephone bills to large business customers, company officials said last week.

Receiving bills via EDI, rather than on paper or magnetic tape, should enable users to process bills more quickly and easily. EDI should also make issuing bills to large customers simpler and reduce mailing costs for Pacific Bell.

The first customer to participate in the trial is Tandem Computers, Inc., a Cupertino, Calif., computer maker. Agreements with two other customers to participate in the trial are pending, but Pacific Bell officials declined to name them.

"EDI allows customers to process their telephone billing internally with a minimum of conversion" from paper into a computer, said Paul Blake, a staff manager at Pacific Bell. "Converting billing data from one format to another can be a very time-consuming process, especially when you get a bill that may be

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RISC System/6000 takes on big role in IBM mgmt. plan

IBM likely to bring AIX under its SAA umbrella.

By Paul Desmond
Senior Editor

Recent announcements from IBM and its business partners point to an increasingly important role for the IBM RISC System/6000 in IBM's network management strategy, supporting everything from expert systems to multivendor equipment.

The development is being met with open arms by users and analysts who say the AIX-based RISC System/6000 will foster more third-party application development, have the horsepower to off-load functions from the host-based NetView and allow for more distributed management.

But it also raises the question of where AIX, IBM's version of Unix, fits into IBM's management strategy, especially since it is not yet part of IBM's Systems Application Architecture (SAA).

Ray Williams, senior technical staff member for network management systems at IBM, said the company will probably bring AIX under the SAA umbrella. He also said IBM intends to provide the same management tools on both AIX and OS/2 Extended Edition, allowing users to choose the operating system they like to meet different net management needs.

Those revelations follow two other announcements in recent weeks. IBM announced an agreement with Hewlett-Packard Co. to port HP's OpenView net management platform to the RISC System/6000 for management of

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NCR pushes back release date of OSI-based router

By Paul Desmond
Senior Editor

ST. PAUL, Minn. — NCR Corp.'s Network Products Division last week acknowledged it has missed the ship date for its OSI-based multiprotocol router announced in October, adding that the product will not ship until later this year.

NCR's Open Network System (ONS) router promises to help users build a single Open Systems Interconnection backbone that can support a variety of networking protocols ("NCR rolls out router for OSI backbones," *NW*, Oct. 22, 1990). Among them are IBM's Systems Network Architecture, Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s DECnet, Novell, Inc.'s Integrated Packet Exchange (IPX) and Xerox Corp.'s Xerox Network System.

NCR declined to explain why it missed the April shipping date other than to say the development effort was more extensive and complex than anticipated.

Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C., said NCR had problems achieving performance goals.

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Briefs

Infonet to intro LAN internet service. Infonet Services Corp. in El Segundo, Calif., this month plans to announce a local-area network internetworking service that will be based on routers installed at Infonet network facilities, a source close to the company said last week. No details on pricing or the type of traffic supported were available at press time.

DEC readying multiprotocol routers. Digital Equipment Corp. is expected to introduce next month its first line of high-end multiprotocol routers, which will support wide-area links ranging in speed up to T-1 rates and will include DEC's implementation of the emerging Intermediate System-to-Intermediate System routing protocol.

The routers are also expected to be the first DEC products capable of routing the company's Open Systems Interconnection-based DECnet Phase V protocols. Besides DECnet Phase V, these new machines will also route Transmission Control Protocol/Internet Protocols. DEC is expected to add support for other protocols in later software upgrades.

FTS 2000 squabble heats up. The General Services Administration last week turned down a request from the House Government Operations Committee to suspend the migration of the U.S. Navy's network traffic to the Federal Telecommunications System (FTS) 2000 network until questions regarding alleged GSA mismanagement of FTS 2000 are cleared up.

Rep. John Conyers (D-Mich.), chairman of the committee heading up the investigation into the circumstances surrounding GSA's transfer last October of the Navy traffic from AT&T to US Sprint Communications Co., said angrily, "It's one thing that the GSA's incompetent management is threatening this important program, but quite another that the GSA refuses to take rudimentary action once deficiencies have been pointed out to them."

The General Accounting Office has criticized the Navy reassignment, saying it has aggravated the imbalanced revenue split between AT&T and US Sprint. Although AT&T is only receiving about 40% of FTS 2000 revenues instead of the 60% required under the contract, US Sprint claims that the discrepancy can be traced to AT&T's reluctance to convert agencies to FTS 2000.

In a letter to Conyers, Chris Rooney, president of US Sprint's Government Systems Division, wrote, "This is because AT&T is currently providing services to agencies outside of FTS 2000 at considerably higher prices. AT&T's economic interests are far better served by converting the existing government traffic to FTS 2000 as slowly as the GSA and [the GAO committee] will tolerate."

AT&T called the US Sprint statements "the same old nonsense."

Ericsson, Hughes back frame relay. Ericsson last week said it plans to add a frame relay interface to its ERIPAX X.25 packet switches early next year. The company said development of its frame relay interface is being based on the emerging Consultative Committee on International Telephony and Telegraphy standard and is progressing on schedule.

Hughes Network Systems, Inc. recently announced that it added a frame relay interface to its Integrated Packet Network. The interface complies with an interim interpretation of the emerging CCITT frame relay standard that is backed by Cisco Systems, Inc., Digital Equipment Corp., Northern Telecom, Inc. and StrataCom, Inc.

AT&T: switched videoconferencing. AT&T last week introduced a full-motion videoconferencing offering that will enable customers of its Accunet Switched 56 and Software-Defined Data Network services to support interactive, multipoint videoconferences.

The new Switched Videoconferencing Service (SVS), which requires 56K or 112K bit/sec of bandwidth, can be used with PictureTel Corp. 2000, 3000 and 4000 Series and Compression Laboratories, Inc. Rembrandt 2/06 coder/decoders.

AT&T expects users will typically employ two switched 56K bit/sec links to access the service, which is being offered from AT&T's SVS Center in Atlanta. At the SVS Center, lines are connected to AT&T's voice-activated video bridging equipment. That equipment senses changes in audio levels during a conference and switches when a change occurs, allowing the current speaker to be seen and heard by all conference locations.

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Networked imaging users attest to competitive gains

Systems cut down on time, paper, clerical staff.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — Representatives from several large corporations outlined here last week how the use of networked imaging systems have helped them eliminate paper, cut down on clerical staff and keep their companies competitive.

Companies represented at the Association for Information and Image Management (AIIM) trade show here included American Airlines, Inc., Empire Blue Cross/Blue Shield and Texas Utilities Co.

"Our [work] volumes forced us into imaging," said Michael Nieberding, vice-president of advanced technology for Empire Blue Cross. The company recently installed imaging systems at Empire Blue Cross locations in Albany, Yorktown and Manhattan, New York.

Empire Blue Cross now has 764 IBM Personal System/2 55 SX workstations linked via 16M bit/sec Token-Ring local-area networks to IBM PS/2 Model 80 and 90 image servers at the three sites. The networks can process 700,000 pieces of paper per day.

Employees use Eastman Kodak Co.'s 900-S scanners to scan insurance documents into the network. Documents are compressed for storage on 1,803 Cygnet Systems, Inc. 12-in. optical-disk jukeboxes using Sigma Imaging Systems, Inc.'s Omni-Desk software. The same workstation software is used to expand the images for later viewing.

Empire Blue Cross, which is adding 200 new imaging workstations each month, plans to ultimately have 3,000 imaging workstations up and running, said Nieberding. A limited amount of imaging traffic is shared between the company's Albany and New York City locations via a T-3 backbone.

Nieberding said an image file of a piece of paper consists of about 450,000 bytes of information and that network requirements need to be scrutinized.

Declining to divulge specific costs, Nieberding estimated that the company will recoup its capital expenditure investment in 2½ years, largely through the elimination of 534 file clerks. The firm has already seen an 8% productivity gain through imaging.

Utility companies are also entering imaging in a big way.

Texas Utilities was overwhelmed by computer-aided design and manufacturing drawings when building a new nuclear power plant at its Glen Rose, Texas, Commanche Peak Steam Electric Station site, said Randall Taylor, operations administrative manager at the company.

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States advise Kentucky in planning new backbone net

By Bob Brown
Senior Editor

FRANKFORT, Ky. — The State of Kentucky plans this week to issue a request for proposal for a new, integrated statewide backbone network — a network plan that communications executives from three other states helped Kentucky draft.

The proposed network will support the growing voice, data and video requirements of state agencies in more than 20 cities, as well as more than 25 educational institutions. The state's existing analog microwave voice network and leased data net are no longer robust enough to support the state's communications needs and it hopes to save money by consolidating them.

> "Our peers have more of an appreciation for the budgetary and other limitations we face."
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No price tag has been put on the network project, nor can it be determined what the net will ultimately look like.

But the RFP, which was issued jointly by Kentucky's Division of Telecommunications and Department for Information Systems, calls initially for establishing a pilot net to link government facilities here, in Lexington and in Louisville by July 1992.

The network will probably support Synchronous Optical Network (SONET) standards over high-speed fiber and microwave links "unless anybody tells me that it can't be done," said Paul Warnecke, director of Kentucky's Division of Telecommunications.

In planning its RFP for the network project, Kentucky officials formed a consulting team including network personnel from other states who evaluated the state's network requirements. Kentucky arranged for this consulting team through the Council of State Governments.

The consulting team, which included representatives from Florida, Ohio and Wisconsin, summarized its findings in a report used by Kentucky's telecommunications and information systems officials in drafting the RFP to be issued this week.

Telecommunications officials in Kentucky sought help from users in other states, hoping to draw on their experiences with similar projects.

"We feel that our peers have more of an appreciation for the budgetary and other limitations we face as state government agencies," Warnecke said. He noted that he monitors other states, such as Iowa, that are involved in major network projects ("Iowa T-3 net is a political hot potato," *NW*, April 1).

"The Council of State Governments picked states that closely resembled where we are right now or where we hope to get with our network," said David Ballard, director of operations for Kentucky's Department for Information Systems. "Wisconsin recently went through building an integrated backbone network. Ohio has an extensive microwave net, like us. And Florida has lots of LANs, which is another area we're planning to get more involved in."

Kentucky only had to pay for the consulting team's traveling expenses and could rely more on the group's objectivity than that of an independent consulting firm, said Jody McCann, state telecommunications officer within Wisconsin's Bureau of Information and Telecommunications Management.

The consulting team's suggestions included setting up a formal management group within the state government to oversee the network project — a recommendation that has already been embraced, Warnecke said.

Tim Steiner, agency services manager in Ohio's Department of Administrative Services and a member of Kentucky's consulting team, recommended that Kentucky adhere to the Government Open Systems Interconnection Profile where possible.

For additional information on the Council of State Governments' Interstate Consulting Service, call (606) 231-1875. ◻

Toll fraud victims tell FCC carriers are unresponsive

Having lost millions of dollars to hackers, users urge commission to establish carrier liability rules.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Users victimized by toll fraud last week told the Federal Communications Commission that long-distance carriers are sometimes unresponsive and inept at helping to resolve their problems.

The users filed comments as part of an FCC proceeding examining whether the agency should establish rules on toll fraud liability. Currently, carriers generally hold users responsible for the full amount of toll fraud. But users told the FCC that carrier actions often contribute to or fail to minimize toll fraud problems and said telephone companies should shoulder some of the liability.

In a joint filing, the New York Clearing House Association, Pacific Mutual Life Insurance Co., the Securities Industry Association and Visa USA, Inc. accused AT&T of washing its hands of toll fraud problems even when it may have contributed to them.

"AT&T has one response to every question regarding its failure to warn of the possibility of fraud, monitor its network or respond quickly to signs of trouble — 'It's your problem,' " the group stated in its filing.

Network toll fraud involves hackers who dial into a private branch exchange and use a stolen authorization code to dial out to any destination in the world or who trick voice mail systems into giving them an outgoing line.

The Communications Fraud Control Association claims consumers lose $500 million annually to toll fraud, and experts say the problem is getting worse.

Users told the FCC about the frustration of seeing hundreds of thousands of dollars in fraudulent charges run up while they received little help from carriers in stopping the problems.

Aeronautical Radio, Inc., a communications company that serves the air transport industry, said the FCC must step in to help users. "The absence of a national policy that adequately responds to the realities of toll fraud has allowed interexchange carriers to avoid addressing toll fraud issues," the firm said.

Aeronautical Radio said it is aware of several airline companies that have lost more than $100,000 each, for a total loss of more than $1 million.

Avnet, Inc., a nationwide wholesale distributor of electronic components and computer products, told the FCC it lost $750,000 in two toll fraud episodes last year. One of those incidents resulted from a hacker breaking into an AT&T Software-Defined Network (SDN) data base and stealing Avnet's authorization codes.

Avnet said it had 3,000 authorization codes for use with the Network Remote Access feature of SDN, which allows users to dial into the net using an 800 number and place outgoing calls. Avnet knew it would not need all 3,000 codes initially but allowed AT&T to store them in the SDN data base to speed the activation process when they were needed.

Without Avnet's knowledge, AT&T input all of the codes in an active status. And during the weekend of Sept. 7 to 10, 1990, hackers accessed the AT&T data base by dialing a special 800 number that Avnet had been assigned and stole the codes. During that period, $500,000 in long-haul charges were run up.

> "AT&T has one response to every question — 'It's your problem.' "
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Avnet claims it was never warned about the possibility of toll fraud and was assured by AT&T that its codes would be tightly controlled. AT&T has told Avnet that the firm is fully responsible for the charges.

A second incident earlier this year caused Avnet a loss of $250,000. The company claims AT&T set up a PBX for Avnet with three-digit codes for accessing outgoing lines. Avnet claims it was not advised that longer authorization codes were available that would have provided better protection from toll fraud.

"There is no explanation for the ineptness demonstrated by AT&T other than AT&T's confidence that its tariff exonerated it from responsibility," Avnet said.

Perkin-Elmer Corp., a leading manufacturer of precision analytical instruments, told the FCC about its loss of $250,000 because of toll fraud. The firm had a three-layer authorization code system in place to protect against security breaches on its AT&T PBX, but despite the elaborate system, hackers obtained access to the PBX via an international 800 line installed in 1988.

Perkin-Elmer said it began to receive bills for 800 service that

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1975 *Launched the first U.S. public data network.* 1979 *Built the first commercial private packet network.* 1980 *Created the first hybrid network using private and public capabilitie*

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1988 *Sprint completes the only nationwide 100% digital fiber optic network. Awarded 40% of Federal Telecommunications System 2000 contract.* 1989 *World's first and largest*

1985 *Sprint introduces the world's first VPN.℠* 1986 *First transcontinental fiber optic call transmitted by Sprint.* 1987 *Eight million FŌNCARDs℠ distributed in first year.*

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privately-owned transatlantic fiber optic cable completed. 1990 *Sprint announces first commercial video services to the Soviet Union. Sprint introduces first nationwide ISDN capabilities.*

Dun & Bradstreet unveils plans for European network

Will carry mostly X.25, SNA business unit traffic.

By Barton Crockett
Senior Editor

WILTON, Conn. — The Dun & Bradstreet Corp.'s DunsNet unit last week revealed plans to cut over by September a new European backbone network that will position the company for rapid growth in the years ahead.

The network will be supported by Network Equipment Technologies, Inc. multiplexers located in five major European cities. The switches will be interconnected by a mesh network of private lines ranging in speed from 64K to 384K bit/sec.

The net will carry primarily X.25 and IBM Systems Network Architecture traffic from Dun & Bradstreet's major business units, which are anticipating rapid growth in Europe, according to Allan Conner, president of DunsNet.

"The Dun & Bradstreet companies are in a position for a great deal of increased business, especially with the coming of 1992 and the reduction of trade barriers within Europe," Conner said. "We're doing this to have a communications platform that will enable us to react to rapid growth."

Conner said the network will also reduce communications costs and improve reliability.

DunsNet, based here, operates a global network serving Dun & Bradstreet's disparate business units, which include A.C. Nielsen, D&B Information Services, which handles credit reporting, Dataquest and Moody's Investors Service.

Last year, Dun & Bradstreet earned $1.3 billion of its total revenues of $4.8 billion in Europe.

DunsNet began installing the new European network in March. When installation is completed in the fall, the new net will consolidate X.25 and SNA traffic now routed over separate facilities.

Conner said Dun & Bradstreet customers and employees use the X.25 and SNA networks to access credit reports and other information services supported by mainframes in the company's European data centers.

DunsNet now routes European X.25 traffic over a redundant mesh network based on Sprint Data Group packet switches in Frankfurt, Germany, London, Milan, Italy, Paris and Rotterdam, the Netherlands. These switches are linked primarily by 64K and 128K bit/sec and analog circuits.

Point-to-point circuits span out in a star topology from the backbone nodes to multiple remote packet assembler/disassemblers in 14 western European countries, including Belgium, France, Germany, The Netherlands and Switzerland. There are about 60 nodes on the European X.25 network.

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DEC adds low-end DECnet router, software upgrades

By Jim Brown
Senior Editor

MAYNARD, Mass. — Digital Equipment Corp. last week introduced a low-end DECnet router with a top line speed of 64K bit/sec, as well as enhanced software that adds support for TCP/IP's Telnet protocol to its DECserver 300 terminal server.

The company also introduced a new version of its DECnet/SNA Data Transfer Facility that for the first time enables DEC VAXes to exchange files with IBM VM-based mainframes. Previous versions of the software only supported file transfer between VAXes and MVS mainframes.

The company's new DECrouter 150 is designed to tie small branch offices with low traffic volume into larger DECnet networks, said Lee Cooper, DEC's networks marketing manager. The unit includes a single Ethernet connection and two wide-area ports that support RS-422, RS-423, RS-232-C, RS-232-D or CCITT V.35 interfaces.

The DECrouter 150 can access two 19.2K bit/sec leased lines simultaneously. It can also access one 56K or 64K bit/sec leased line and a 9.6K bit/sec dial-up or leased line. That configuration lets users route traffic to a dial line when the primary line fails.

Initially, the DECrouter 150 will route DECnet Phase IV traffic only. DEC intends to upgrade the device with software supporting the International Standards Organization's emerging Intermediate System-to-Intermediate System (IS-IS) routing protocol.

That will enable the DECrouter 150 to route DECnet Phase V traffic as well as Transmission Control Protocol/Internet Protocol traffic. IS-IS will also allow users to mix DECrouter 150s in a network with other vendors'

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New MCI feature supports Vnet, Vision calls to U.S.

By Bob Wallace
Senior Editor

WASHINGTON, D.C. — MCI Communications Corp. will soon allow customers with calling cards for its Vnet virtual network and Vision services to use the cards to place calls to the U.S. from more than two dozen countries.

The new capability, called Global Reach, is a major development for MCI, said John Crooks, MCI's Vnet director. "Up until now, card customers have not been able to originate Vnet card calls from overseas," he said. AT&T and US Sprint Communications Co. have offered this capability for some time.

With Vnet Global Reach, overseas callers will be able to dial a toll-free number, which is different for each country, to reach an MCI operator in the U.S. The MCI operator will allow callers to dial into their company's virtual network or place off-network calls based on their caller authorization number and calling range privileges.

With Vision Global Reach, users dial the same toll-free number and reach U.S.-based MCI operators, who then process the calls.

Vision is an outbound long-distance service targeted at small and midsize business customers that spend up to $50,000 per month on long distance.

Global Reach can be used from more than two dozen countries now. Another two dozen are expected to be added by the end of the year, Crooks said.

Span of service

Vnet and Vision card calls can be made from Canada, most European countries, Central and South America, the Middle East and Pacific Rim, Crooks said.

The European countries include Belgium, Denmark, France, Germany, Greece, Ireland, Italy, the Netherlands, Spain, Switzerland and the U.K.

Calls can also be placed from Hong Kong, Israel, Japan, Malaysia and Singapore. South American countries from which Global Reach calls can be originated include Brazil, Chile and Columbia.

"It's certainly something we will use," said Thomas O'Toole,

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NCR delays OSI-based router

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Dzubeck said NCR expected to achieve throughput of 45,000 packet/sec using a single processor. But it is likely that the firm had to add more processors, which creates more overhead and performance degredation. "They hadn't even measured what the performance was when they made the [October] announcement," he said. "I'm sure when they measured it, they got a great shock."

David Passmore, a partner with Ernst and Young's Network Strategies, Inc., a consultancy in Vienna, Va., also speculated that NCR was having performance problems. He said the company likely ran into problems because it was attempting to build the ONS on a standard hardware platform based on Intel Corp. microprocessors and Unix. Most other router vendors build on a dedicated hardware and software platform optimized for routing.

NCR would not confirm or deny those assessments.

NCR asserted that it will not lose sales opportunities because of the shipment delay. But Passmore said that will be the case only if NCR expects to sell ONS exclusively to users that need OSI backbones. The delay could hurt NCR if it wants to compete with established router vendors such as Cisco Systems, Inc. or Wellfleet Communications, Inc.

IBM is also expected to announce a Unix-based multiprotocol router and could get a jump on NCR, Passmore said.

NCR said ONS field tests will begin this quarter and the product will ship in the second half of the year.

Bytex bases LAN hub on matrix

continued from page 1

Users will be able to connect a faulty port on any hub in a Maestro Control Network to a port on one hub supporting test equipment. With other hubs, engineers must unplug a line from a faulty port to plug in test equipment.

Analysts said Bytex's matrix switching technology will give the company an edge over other hub vendors because it eliminates the manual work involved in reconfiguring networks.

"Bytex has built some of the fundamentals of their matrix switching heritage into this product," said Bill Redman, vice-president of network services at Gartner Group, Inc., a consultancy in Stamford, Conn.

Bytex also built into Maestro many of the fault-tolerant features that enable its matrix switches to continue functioning even if a part fails, which will aid Bytex in attracting high-end users, analysts said. For instance, the hub is powered by dual power supplies, one of which will feed the power if the other fails.

Other vendors providing hubs with dual power supplies require users to switch in a replacement when the primary unit fails, resulting in a power loss to the hub for an undetermined time.

"Bytex has something interesting to look at here," said Janet Hyland, director of network strategies research for Forrester Research, Inc., a consulting firm in Cambridge, Mass. Fault-tolerant features position Maestro to support mission-critical LAN applications, she added.

Bytex's matrix switching technology is implemented on the Maestro Intelligent Switching Hub, a chassis with 17 board slots. One slot houses a controller board that maintains hub configuration, monitors hub performance and provides an interface to the net management system.

Twelve slots support interface boards, each of which have 12 RJ-45 ports supporting connection of workstations or external bridges and routers. Any of the slots can support hub interconnect boards that enable users to create a token ring spanning multiple hubs.

The remaining four slots support optional boards such as the Maestro Ring Monitor. Bytex is trying to lure third-party vendors to build bridge and router boards that will plug into an option slot.

"The only disadvantage Bytex has is that it does not have a bridging and routing capability," said Shirley Hunt, a LAN industry analyst with Dataquest, Inc. in San Jose, Calif. "But that's going to come soon." In fact, Bytex said it will announce an alliance with a major bridge and router vendor within the next month but declined to identify the firm.

Connections between ports or hubs can easily be changed by issuing software commands from a Sun Microsystems, Inc. SPARCstation running Maestro Network Management System software. That software also receives alarms from hubs and displays them on the screen using a graphical user interface. The object-oriented software enables users to display an image of a hub on screen and click on specific ports to reconfigure them or explore problems.

The management station can be directly attached to the diagnostic port on a local hub controller board or to remote hub controller boards via 9.6K bit/sec leased or dial-up modems. Bytex is currently deciding whether to develop an interface that will enable workstations running Simple Network Management Protocol software to moinitor and control the hubs.

Scheduled to ship in July, a Maestro system will cost between $250 and $300 per port.

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

"In contrast to the maturing computer market, the server business displays the refreshing characteristics of a healthy growth industry. New entrants keep appearing, profit margins are good, and substantial dollars are being spent on marketing."

Doug Crook
Senior industry analyst
Server Systems industry service
Dataquest, Inc.
San Jose, Calif.

People & Positions

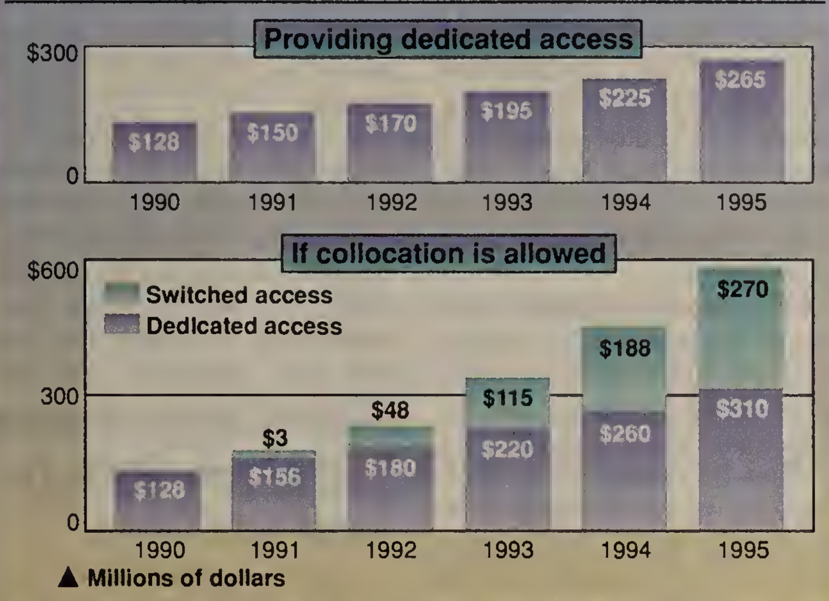
Hughes LAN Systems, a Mountain View, Calif., maker of local-area network equipment, last week named **Bobbi Murphy** as vice-president of marketing.

Murphy will be responsible for helping to establish Hughes LAN Systems as a major LAN provider for large users. Previously, Murphy held several positions with 3Com Corp., including director of marketing for the Enterprise Systems Division.

Network Equipment Technologies, Inc., (NET) a Redwood City, Calif., multiplexer maker, last week named **Steven Markman** to the newly created position of senior vice-president and general manager of networked systems. Markman will be responsible for NET's three product divisions: Networked Systems, Access Products and Network Applications. He will report to Daniel Warmenhoven, NET's chairman and chief executive officer.

For the past five years, Markman has held senior management positions at Hewlett-Packard Co. Most recently, he was general manager for HP's Information Networks Division.

Alternate access carrier revenue projections



Collocation refers to placement of alternate access carrier network equipment in local exchange carrier switching offices to link the nets.

GRAPHIC BY SUSAN SLATER SOURCE: CONNECTICUT RESEARCH REPORT, GLASTONBURY, CONN.

Alternative carriers forge into advanced net services

See market as niche not filled by local carriers.

By Bob Brown
Senior Editor

Having exploited local carrier shortcomings in customer service, network reliability and pricing in recent years, alternative access carriers are attacking what they perceive as another local carrier weakness — slow deployment of advanced network services.

Alternative access carriers have begun rolling out services based on such technologies as Integrated Services Digital Network and Synchronous Optical Network (SONET) standards that traditional local telephone companies have been slow to address, industry observers said.

"The issue of whether or not alternative local transport carriers bring innovation to the telecommunications market has been a point of some controversy," said Dick Tomlinson, president of Connecticut Research Report, a Glastonbury, Conn., market research firm that recently published a study of the bypass market.

But that controversy might die down, he said, given the ISDN, SONET and metropolitan-area network plans being laid out by some of the larger alternative access carriers.

Innovative offerings

Teleport Communications Group, a large alternative access carrier, two weeks ago began offering ISDN Basic Rate Interface (BRI) services in New York.

Last month, Teleport said its Chicago network will be based on SONET, a feat Teleport has been able to accomplish largely because the construction of its network coincided with the availability of some of the first SONET-based products ("Teleport-Chicago says its net is first based on SONET," *NW,* April 15).

"We're trying to get services like ISDN out to customers as early as possible so that they can test out applications," said Bill Baldwin, general manager for TC Systems, Inc., a Teleport subsidiary that is offering the ISDN services.

Royce Holland, president and chief executive officer of Metropolitan Fiber Systems, Inc. (MFS), another leader in the alternative access market, told *Network World* last week that his company plans to announce services within three months that address the local-area network interconnection market.

Holland also claims that the regional Bell holding companies have been slow to address that market.

The services, some of which are being tested at customer beta sites, include metropolitan-area network services incorporating Fiber Distributed Data Interface and other technologies to link LANs at speeds as high as 100M bit/sec. Holland declined to give more details about the services.

"We're seeing a lot of customer demand for LAN bridging and routing," Holland said.

RBHC competition

Holland acknowledged that one reason his company and its counterparts are eyeing advanced services is that the RBHCs have taken steps to counter traditional alternative access carrier strongholds. The RBHCs have re-

(continued on page 10)

DG rebound tied to Aviion server sales

After half a decade of dreary financial reports, Data General quietly stages a strong comeback.

By Bob Brown
Senior Editor

WESTBOROUGH, Mass. — Data General Corp., which two weeks ago reported its second straight profitable quarter after five years of losses, is crediting strong sales of its Aviion servers as a key factor in its surprising turnaround.

While sales of the company's core line of Eclipse MV minicomputers have held steady in recent months, DG's executives recognize that demand for proprietary minicomputers is fading. Therefore, the firm is staking its future on the open systems-based workstations and servers that make up its 2-year-old Aviion line.

"Data General's got a good story to tell about its servers," which support major systems and networking standards and have been brought to market faster than competing models from major rivals, said Doug Crook, senior industry analyst for the Server Systems industry service of Dataquest, Inc., a San Jose, Calif., market research firm.

But, he added, "no one's been paying much attention to Data General's servers. They've been so busy predicting the company's demise because of the Eclipse line."

For its second quarter, ended March 30, DG reported earnings of $19.2 million, compared with a net loss of $8.6 million in the second quarter last year.

Revenue grew less than 2%, to

(continued on page 10)

Steve Baxter

INDUSTRY BRIEFS

NATA seeks computer-phone link standard. The Computer Task Force of the North American Telecommunications Association (NATA) recently held its first meeting to discuss computer-to-telephone interface standards.

The 50 member companies agreed that a standard interface is needed to link computer and telephone systems in order to help marketing and sales agents obtain quick access to data base information about incoming calls. The task force wants ANSI and the European Computer Manufacturers Association to work together to resolve differences in their current proposals for a computer-to-telephone application program interface.

Intergraph to sell Wellfleet routers. Wellfleet Communications, Inc. last week announced it has signed a reseller agreement with Intergraph Corp., under which Intergraph will market the Wellfleet Feeder Node and Link Node routers. Under the agreement, Intergraph will sell the Wellfleet routers with Intergraph computer graphics software and workstations to customers requiring networked computer-aided design systems.

Novell, TGV terminate OEM agreement. TGV, Inc., a Santa Cruz, Calif.-based software house, announced last week the dissolution of its OEM agreement with Novell, Inc., under which Novell was licensed to sell its own version of TGV's MultiNet software providing Transmission Control Protocol/Internet Protocol connectivity to VAX/VMS systems. Users of Novell MultiNet will receive full credit on the price they paid for the software. The reimbursement can be applied toward the

(continued on page 10)

DG rebound tied to Aviion sales

continued from page 9

$320.4 million, for the second quarter, compared with revenue of $314.8 million in the corresponding quarter of 1990. But during the recent quarter, sales of DG's Unix 5.4-based Aviion products grew to record levels — as high as $50 million, analysts said. According to Ronald Skates, DG's chief executive officer, the Aviion servers were particularly strong sellers.

The server line spans from the 19 million instructions per second (MIPS) 3200 server to the recently announced Aviion AV 8000, which boasts 117 MIPS and support for as many as eight local-area networks. DG's entry-level servers can be purchased for as little as $1,300, and multiprocessing superservers start at less than $100,000.

Users in the 1990s are demanding "multiple definitions of servers — file servers, network servers and superservers," said Steve Baxter, DG's vice-president of corporate marketing. "I think we've got a pretty compelling story here. We can provide complete technical flexibility" with a range of server products.

Baxter said DG typically faces off against big systems vendors, such as IBM and Hewlett-Packard Co., for server sales.

When competing with the systems vendors, DG promotes the concept that it has brought open computing products to market faster than its rivals.

"Data General's been a leader in time to market," Crook said. "DG made a 100% commitment to open systems early on and has delivered on that promise."

> "DG made a 100% commitment to open systems and has delivered on that."
>
> ▲▲▲

Katherine Jones, senior product marketing manager for network management at DG, claimed that companies such as IBM and Digital Equipment Corp. have hidden agendas that involve offering open systems products in the hope of selling more proprietary systems and networking products.

According to Jones, DG has positioned itself well against large rivals by teaming up with other networking vendors, such as Novell, Inc. and Oracle Corp., to bolster its server offerings.

DG was among the first vendors to roll out a Portable NetWare offering. In addition, the company recently announced plans to work with Action Technologies, Inc. to port Novell's Message Handling System to its Aviion systems.

DG supports Oracle's data base products, as well as the data base offerings of about a dozen other major vendors, on its Eclipse and Aviion products.

When DG squares off for business against server market startups such as NetFRAME Systems, Inc., the vendor stresses service and support, Baxter said.

"One of the key areas in offering servers is what happens after the sale," he added. "That's where a company like Data General, with an established service and support infrastructure, matches up well against smaller players."

Because the smaller companies tend to focus on market niches, Baxter said DG doesn't face them too often, anyway. ◪

Carriers forge into net services

continued from page 9

sponded to competition in the local loop by deploying redundant fiber loops of their own, shortening the time to provision services and cutting prices where allowed, he said.

Don Lane, staff director of ISDN BRI services at Telesector Resources Group, Inc., a centralized product development and materials management company owned by New England Telephone and Telegraph Co. and New York Telephone Co., acknowledged that alternate access carriers are forging ahead with advanced services. He added that this is bound to spur established telephone companies to push harder to deliver their own advanced service offerings.

Tomlinson warned that "the price of playing poker is going up" in the local telephone market as more local services become commodities due to price competition spurred by alternate access carriers.

"Alternate local transport carriers will need to invest in and offer innovation to survive," he said. ◪

Industry Briefs

continued from page 9

purchase of an equivalent license for TGV MultiNet, according to Paul Rasmussen, TGV's general manager.

The original MultiNet OEM agreement had been established betweeen TGV and Excelan, Inc., which was purchased by Novell two years ago. However, concern about Novell's ability to support its own version of MultiNet and the fact that Novell had not implemented the latest version of MultiNet led TGV to request that the agreement be dissolved, Rasmussen said. "Excelan did direct support for customers, while Novell has distributors," he added.

Xyplex stocks go on the block. Xyplex, Inc. recently made its first public offering of two million shares of common stock at $14 per share. Of those shares, 1.5 million were offered by the company and 500,000 by stockholders.

Boxborough, Mass.-based Xyplex makes the MAXserver product line of multiprotocol communications servers. ◪

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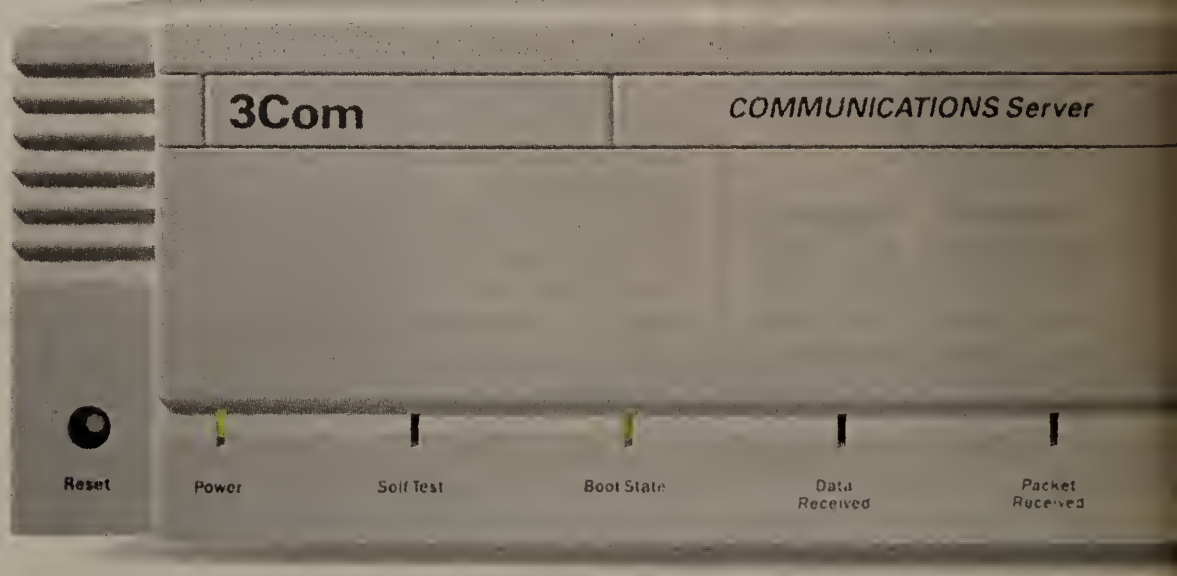

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House bills seek to rein in activities of telemarketers

Would prohibit sale of ANI-generated information.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — Congressional legislation that would establish new boundaries of behavior for the telemarketing industry was debated at a recent House Telecommunications and Finance subcommittee hearing.

Two bills recently introduced by Rep. Edward Markey (D-Mass.) — the Telephone Advertising Consumer Act and the Telephone Consumer Privacy Rights Act — would prohibit the selling of information gained through automatic number identification (ANI).

The two bills would also require the Federal Communications Commission to establish a national data base comprising names of people who do not want to receive unsolicited facsimile advertising or telemarketing calls.

If the Telephone Advertising Consumer Act is passed, telemarketers would have to check the list of objecting persons before calling prospective customers.

Richard Barton, executive director of the Direct Marketing Association, said the requirement would inhibit the most common form of telemarketing used by American businesses — outbound telemarketing by live operators.

"Its reach would be comprehensive in dampening today's major telemarketing practices," he said.

The bill would also prohibit calls from automatic dialers or computer-generated fax advertising from being directed to numbers assigned to paging and cellular telephone services.

Automatic dialers, using computerized lists of phone numbers, have become a source of annoyance to people using pagers and cellular phones, testified Michael Frawley, president of Gold Coast Paging, Inc. and a member of the board of directors of the mobile telecommunications industry group, Telocator.

"Programmed autodialer calls can and have run through whole blocks of numbers assigned to mobile users, unnecessarily setting off pagers and producing unwanted and expensive calls to cellular subscribers," Frawley told the congressional subcommittee.

"Moreover, because many of these machines do not release the connection until the entire prerecorded message has been played, these automatic dialers frequently tie up mobile facilities for hours," he added.

The act would require common carriers offering caller ID or ANI to provide per-call blocking.

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Ensuring call blocking

The Telephone Consumer Privacy Rights Act would also require any common carrier offering a caller identification service, such as caller ID or ANI, to provide free per-call blocking to those who want to prevent their phone numbers from being revealed.

The bill excludes the per-call blocking requirement for caller ID service used within the same limited system of a Centrex or private branch exchange system.

In addition, special public service and law enforcement agencies are excluded from the bill's blocking requirement.

Richard Brown, president of Illinois Bell Telephone Co., testified that the enactment of a federal law mandating blocking on caller ID would disrupt plans worked out between the Illinois Commerce Commission and his company for introducing caller ID without call blocking by year end in that state.

"The proposed federal legislation would override the work and effort of the Illinois [Commerce] Commission staff," said Brown, who added that caller ID without blocking was a deterrent to harassing phone calls.

"Caller ID increases privacy," he said. "We believe that everyone has a right to privacy but not to anonymity."

However, Rep. Matthew Rinaldo (D-N.J.), stating that one-third of the phone subscribers in his state had an unlisted number, questioned how telephone companies could charge consumers for unlisted numbers and yet allow them to appear on caller ID devices against their wishes.

Brown avoided directly answering that question.

Resale prohibition

Markey's bill would also prohibit resale of information gained about a customer through the ANI service unless the customer's authorization is obtained.

Donald MacKenzie, president of Nynex Information Resources Co. and chairman of the Yellow Pages Publishers Association's (YPPA) public policy committee, said he spoke for the association's 140 members when he voiced support for the resale of information prohibition.

MacKenzie said the YPPA had adopted a privacy protection policy in June 1990 that required its members to first request authorization before adding their names to specialized lists that are resold to direct marketing operations.

MacKenzie said he hoped laws would eventually be written with similar restrictions to govern the customer information collection activities of all advertisers and information providers. ◘

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well as tailor resource connection options for the user and offer them on a menu.

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When ROLM® sales rep John Axselle arrived at Virginia Tech, he knew he was in for a lot of homework.

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Soon, students were able to access library research materials from personal computers in their dorm rooms. Professors and students alike were conducting electronic bull sessions with their counterparts around campus and around the world. And one day, students will be able to take a morning class at the Sorbonne and attend an afternoon lecture at Oxford. All without leaving campus. And all thanks to the ROLM 9751.

Could John Axselle have sold a system without all of his questions? Probably. It's done every day. Could he have helped design a system specifically matched to the campus-wide needs of Virginia Tech? Definitely not. And that's a lesson that shouldn't be lost on you the next time you're considering a telecommunications company.

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TELECOMMUNICATIONS

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Worth Noting

Revenues from the sale of telecommunications equipment in the U.S. will more than triple from $20.1 billion this year to $60.9 billion in 1996, according to a recent study by Market Intelligence Research Corp., a Mountain View, Calif., research firm. Telecommunications equipment includes on-premises switches, facsimile, automatic call distributors, voice processing systems and modems.

Carrier Watch

New Jersey Bell Telephone Co. last week announced Business Answer Call, a voice-messaging service that will be offered through more than 130 central offices to midsize and large companies by year end.

Business Answer Call requires no special customer premises equipment and enables users to send, receive and reply to messages 24 hours a day, seven days a week. Customers can also issue messages to preset distribution lists.

Net managers can create eight mailboxes per phone line, each with its own personal greeting and password.

The per-line message storage time is allocated among the mailboxes until the total storage time of 35 to 40 minutes is exhausted.

Users can buy individual or multiple mailboxes. A single mailbox with 30 minutes of message storage costs $7 a month, while a mailbox with 45 minutes of message storage costs $8 a month.

Multiple mailboxes with 30 and 40 minutes of message storage cost $9 and $10 per month, respectively.

RBHC ISDN deployment and tariffing plans*

RBHC	BRI	PRI
Ameritech	Filed	Filed
Bell Atlantic Corp.	3Q '91	1Q '92
BellSouth Corp.	2Q '91 to 1Q '92	3Q '91 to 1Q '92
Nynex Corp.	Filed	4Q '91 to 2Q '92
Pacific Telesis Group	Filed	Filed
Southwestern Bell Corp.	4Q '91 to '92	3Q '91 to 1Q '92
US West Communications, Inc.	2Q '91 to 3Q '91	2Q '91 to 3Q '91

* Does not include tariffs for single-line BRI service.

BRI = Basic Rate Interface
PRI = Primary Rate Interface

SOURCE: RBHC PROJECTIONS SUBMITTED TO BELL COMMUNICATIONS RESEARCH, LIVINGSTON, N.J.
GRAPHIC BY SUSAN J. CHAMPENY

New AT&T service bundles inbound, outbound calling

Volume discount plan aimed at small businesses.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — AT&T recently told the FCC it plans to expand a service for small business users to offer combined volume discounts on inbound and outbound service, despite having a similar large-user proposal rejected last year.

The new service, dubbed CustomNet Plus, adds 800 calling capabilities and discounts to AT&T's CustomNet plan, which offered combined discounts on international and domestic outbound voice services.

AT&T said it needs CustomNet Plus in order to compete effectively against a similar service for small business users rolled out in February by MCI Communications Corp.

"By offering a comparable plan, AT&T expects to stem the loss of AT&T customers that would otherwise find the price and features of MCI's service to be significant inducements to migrate to MCI," AT&T stated in its filing.

MCI filed a protest, claiming AT&T is trying to leverage its position in the 800 service market.

▲▲▲

There's a catch

But AT&T may hit a regulatory snag when the proposed service is reviewed by the Federal Communications Commission. Opponent MCI filed a protest against the new service last week, claiming AT&T is trying to leverage its position in the 800 service market to sell outbound voice services to users.

AT&T has also come under fire for offering 800 services in its Tariff 12 packages.

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That is the same argument MCI made when the FCC last June rejected AT&T's attempt to offer combined discounts on its 800 and Software-Defined Network (SDN) service. The agency ruled that AT&T holds a dominant position in the 800 services market and has substantial market power because a user's 800 number cannot currently be transferred to another carrier.

"By linking the availability of the 800 service discount to a customer's selection of AT&T as its SDN carrier, AT&T is leveraging its significant advantage in the 800 market to gain a competitive advantage in the SDN market," the FCC said in its order.

AT&T has also come under fire for offering 800 services in its discounted Tariff 12 packages.

MCI and US Sprint Communications Co. have both filed formal complaints with the FCC challenging the legality of offering discounted 800 service in Tariff 12 plans.

N.Y. carriers offer up ISDN basic rate links

New York Tel provides ISDN from 2 CO switches after tariff OK'd; TC Systems signs up Citibank.

By Bob Brown
Senior Editor

NEW YORK — New York Telephone Co. and TC Systems, Inc., a subsidiary of bypass carrier Teleport Communications Group, recently began offering ISDN Basic Rate Interface (BRI) services here.

Although New York Telephone has been providing Integrated Services Digital Network service on a special contract basis to several users, its ISDN BRI tariffs were not approved until March and went into effect late last month.

New York Telephone will offer the Centrex and regular ISDN services from two central office switches but has yet to sign up its first regular ISDN customer.

TC Systems, on the other hand, has signed Citibank, N.A., a subsidiary of Citicorp, as the first customer of its Centrex-based ISDN BRI offering. Citibank will use the service to support 64K bit/sec file transfers between personal computers while enabling users to hold simultaneous voice conversations.

"New York's such a big market that the New York Telephone and Teleport ISDN services should be a big boost for ISDN in general," said Steve Sazegari, a telecommunications analyst at Dataquest, Inc., a San Jose, Calif., market research firm.

Teleport ISDN

TC Systems, formed in 1989 to provide switched services from two AT&T 5ESS switches acquired from Merrill Lynch & Company, Inc., will provide local ISDN BRI services for users establishing ISDN links to overseas locations.

TC Systems will use Teleport's fiber network here to link customers to a local AT&T 4ESS international switch. From there, traffic will be routed over AT&T switched digital international circuits to foreign carriers.

(continued on page 40)

WASHINGTON UPDATE

BY ANITA TAFF

AT&T defers effective dates of Tariff 15 deals. At the request of the Federal Communications Commission, AT&T has deferred the effective date of two of its Tariff 15 deals. AT&T pushed back the date for its offering to Thomson Communications Services from April 30 to May 30 and delayed until July 11 a deal for Union Carbide Corp. that was originally scheduled to take effect April 27. AT&T is offering Thomson, a New York publishing firm, a 10% discount off the total monthly charges for Software-Defined Network (SDN) Service Expanded Volume Plan, Megacom 800, Basic 800 and 800 Readyline.

Rival carriers have protested this offering in part because they claim the combined discount is illegal. The FCC told AT&T last year that it could not offer a deal with combined discounts on SDN and 800 services because AT&T has a dominant position in the 800 market and could unfairly leverage that power to sell its SDN services. Union Carbide's deal offers a 23.2% discount on Megacom 800 service rates.

Groups comment on 900 service regulation. About 70 parties filed comments last week on the Federal Communications Commission's efforts to regulate the 900 services industry. About half of the filings were from state regulators, lawmakers and consumers groups strongly endorsing a set of regulations proposed by the FCC in March. The commission has proposed requiring a preamble on 900 services stating the service and prices, after which a caller can hang up without incurring charges. It also suggested requiring carriers to give users a onetime chance to have 900 numbers blocked from their phones and to prevent local carriers from disconnecting basic phone service for failure to pay 900 service charges.

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When choosing an Ethernet LAN, simply ask yourself one question.

Do I want a headache? Or not?

The new HP EtherTwist Hub takes the pain out of networking.

Running a LAN over your phone lines should be easy. But the mess of cables on the left is the way most Ethernet LANs connect with your wiring closet: one cable for every PC.

Hewlett-Packard has a better way.

The HP EtherTwist Hub connects as many as 12 PCs into a LAN, using a single cable. When you're ready to grow, simply plug in another Hub.

That way, you can control your growth in easy 12 PC increments, instead of 120. Or instead of smaller hubs that still need one cable linking every single computer to the wiring closet.

Of course, the HP EtherTwist Hub supports 10Base-T, and is compatible with Novell and LAN Manager. So call **1-800-752-0900, Ext. 2006** for more information on the HP EtherTwist LAN. You'll see how HP has turned a difficult choice into a very easy one.

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Worth Noting

> "Today, you have high-paid engineers or office professionals backing up file servers. That function is increasingly going to be done [via remote links] over time."
>
> **Duncan Campbell**
> OpenView network management marketing manager
> Hewlett-Packard Co.
> Colorado Network Division
> Fort Collins, Colo.

Data Packets

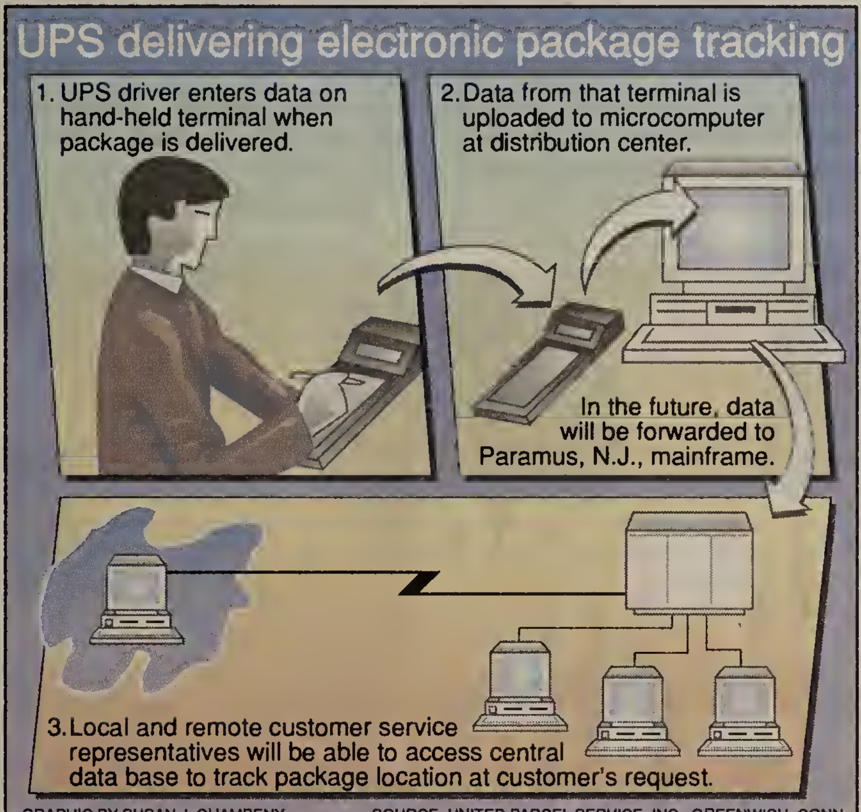
Microcom, Inc. last week introduced a pair of portable modems designed for use with laptop or desktop microcomputers.

The MicroPorte 1042 and MicroPorte 542 support the CCITT V.22bis standard for dial-up modems operating at 2,400 bit/sec. They also support CCITT V.42 error checking and V.42bis data compression, which enables the modems to achieve throughput of 9.6K bit/sec under optimal line conditions.

MicroPorte 1042 additionally supports Microcom's Microcom Network Protocol Class 10, which controls modem speed and the size of data packets. MicroPorte 1042 also supports Microcom's Turbo Mode, which enables the modem to operate at 4K bit/sec when connected to other Microcom modems with Turbo Mode. Used in conjunction with V.42bis, Turbo Mode enables the MicroPorte 1042 to achieve throughput of 12K bit/sec under optimal line conditions.

MicroPorte 1042 is powered by a rechargeable battery with an average life of two hours. The MicroPorte 542 is powered by a nine-volt battery with an average life of 1.5 hours.

The MicroPorte 1042 is priced at $649 while the MicroPorte 542 costs $449. Both modems will be available next month.


UPS delivering electronic package tracking

1. UPS driver enters data on hand-held terminal when package is delivered.
2. Data from that terminal is uploaded to microcomputer at distribution center.
In the future, data will be forwarded to Paramus, N.J., mainframe.
3. Local and remote customer service representatives will be able to access central data base to track package location at customer's request.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: UNITED PARCEL SERVICE, INC., GREENWICH, CONN.

Hand-held computers will help UPS track packages

Tablets will let drivers capture electronic signatures.

By Wayne Eckerson
Senior Editor

GREENWICH, Conn. — After nine years of research and development, United Parcel Service, Inc. (UPS) recently announced that it will equip its 65,000 U.S. drivers with hand-held computers that will improve the accuracy of delivery records and increase record keeping efficiency.

Dubbed the Delivery Information Acquisition Device (DIAD), the 11-by 14-in. unit is microprocessor-based and has a keypad, infrared bar code scanner, small LCD screen and electronic signature pad for capturing customer signatures electronically.

According to Nick Snider, DIAD project manager at UPS, use of the device paves the way for UPS to eliminate paper forms in the delivery, pickup and tracking of customer packages.

The hand-held computers, which were designed to withstand extreme weather conditions, were successfully tested last year by more than 2,000 drivers in more than 80 distribution centers throughout the U.S. The full rollout of the hand-held computers will be completed by mid-1992, Snider said.

While other companies have equipped their drivers with hand-held computers, UPS' device is the first that will capture customer signatures electronically.

Customers will verify they have received a package by signing their names on the DIAD's electronic signature pad with a special nylon stylus that displays an image of the customer's signature on the LCD. This image is then digitally stored in memory.

When delivering a package, UPS drivers use the DIAD's custom keypad to input delivery information, such as shipment numbers, names, addresses and cash-on-delivery payments. At the end of each day, UPS drivers return to their distribution centers, where they upload delivery information to a personal computer that prints out a copy of the data. The printed copy is then sent to the closest regional tracking office, where it is filed.

Currently, UPS drivers handwrite the delivery information on a paper form, which then gets stored in the tracking offices. Snider said the handwritten forms are often illegible, making it difficult to trace packages and respond quickly to inquiries.

The DIAD's bar code scanner will make it easier for drivers to record shipping information when they pick up packages from large customers, and it will eliminate errors due to illegible handwriting, Snider said.

Currently, customers fill out a UPS form that lists the address, weight, shipping number and charges for each package that UPS will pick up that day. The UPS driver validates the information before taking each package. The sheets are then collected and filed at the distribution center at the end of the day.

UPS currently affixes bar codes, which contain shipping information, to all air freight shipments, but it will not begin using bar codes on regular pickups for a year or two, Snider said. UPS has

(continued on page 16)

Beta users praise Reflection software

New Walker Richer & Quinn tool enables PC users to simultaneously access multiple hosts.

By Paul Desmond
Senior Editor

Beta users of new software that lets personal computers simultaneously access multiple hosts say the product is improving productivity and easing frustration for employees.

Walker Richer & Quinn, Inc.'s Reflection Network Series includes four software packages that support links from a DOS-based personal computer to multiple hosts via a single network adapter board. It also lets users establish multiple sessions to a single host to avoid logging on and off of different applications.

E.I. du Pont de Nemours & Co.'s Medical Products group is using or testing all the products in the Reflection Network Series, said Willard Spahn, computer specialist for the Newtown, Conn., firm.

The products include the 3000 Connection, which enables a personal computer with a single network connection to access a Hewlett-Packard Co. host, a Digital Equipment Corp. VAX and a Unix host, as well as a Novell, Inc. server and Microsoft Corp. Network Device Interface Specification-compliant servers.

Other products in the series support the Transmission Control Protocol/Internet Protocol along with DEC's Local Area Transport (LAT) protocol, LAT itself, or the TCP/IP Telnet virtual terminal protocol.

DuPont has numerous hosts to which the 55 Ethernet-attached personal computers in the Newtown site need access, Spahn said, including Novell NetWare servers, Sun Microsystems, Inc. SPARCstations running Unix and VAXes running VMS.

Also, an HP 3000 minicomputer in Wilmington, Conn., supports the company's electronic mail and some manufacturing applications.

Spahn said the Reflection Network Series has paid for itself by cutting the time it takes users to access applications and thereby reducing their frustration level.

That is especially true for accessing the HP host. In the past, personal computers had to be outfitted with an asynchronous adapter, which could support only a 9.6K bit/sec connection to a DECserver terminal server. The DECserver supplied a connection to the Ethernet, which in turn was bridged via a 448K bit/sec T-1 channel to another DECserver in Wilmington and then finally to the HP 3000.

Using the 3000 Connection software, a personal computer can be linked directly to the remote HP 3000 via the Ethernet

(continue on page 16)

Bytex unveils new switch, net management features

By Jim Brown
Senior Editor

SOUTHBOROUGH, Mass. — Bytex Corp. recently unveiled a new low-end matrix switch with half the capacity of the company's former entry-level product and added enhanced alarm and automation features to its microcomputer-based Unity Management System software.

The Unity 50-LE switch is targeted at users with smaller data centers. Because Unity switches can be controlled from a central-site microcomputer, the Unity 50-LE will also appeal to users that need to install a switch at smaller, unattended remote data centers, Bytex said.

A fully configured Unity 50-LE consists of two Distributed Access Unit (DAU) cabinets with 256 ports each, for a total of 512 ports, and a Network Switching System (NSS) cabinet. DAUs are attached via coaxial or fiber-optic cable to the NSS, which houses the processors and software needed to route data from one port on a DAU to another.

The Unity 50-LE supports RS-232, V.35, X.21, the Electronic Industries Association's EIA 530 and four-wire analog circuit interface boards. It has a top-line speed of 320K bit/sec and performs all the functions of the larger Unity 50 switches, which range in size from 1,024 to 4,096 ports.

Like Unity 50s, the new Unity 50-LE enables users to switch

(continued on page 40)

Devices help UPS track packages

continued from page 15

yet to devise a way to make sure its customers use bar codes the hand-held computers can read.

"Initially, we will work closely with our largest accounts to coordinate the use of bar codes so that there is no chance of losing information," Snider said.

The use of the DIAD is the first phase in UPS' plan to eliminate paper entirely from the pickup, delivery and tracking process, Snider said.

To accomplish that, UPS is currently developing an on-line information retrieval system that will store delivery information.

The system, dubbed Delivery Information Automated Lookup Systems (DIALS), is scheduled to be completed in 1993, shortly after all UPS drivers are to be equipped with hand-held computers. It consists of a central data base of delivery information stored on a mainframe in UPS' data center in Paramus, N.J.

At the end of each day, drivers will return to their distribution centers, where they will upload information stored on their hand-held computers to the DIALS data base in Paramus.

Having shipping information stored electronically at one site will improve customer service, Snider said.

When a customer calls to find out the status of a delivery, UPS customer service representatives will access the data base on-line. The representatives will then be able to tell immediately the customer when the package was delivered, to whom and at what address.

With the current paper-based tracking system, it takes UPS between two and five days to inform customers about the status of package deliveries, Snider said, noting that UPS handles more than 60,000 calls a day from customers asking to verify package delivery. ◼

Beta users praise software

continued from page 15

and needs only a single Ethernet adapter board. The link runs at Ethernet speed except for the 448K bit/sec wide-area connection, as opposed to the previous 9.6K bit/sec limit.

In the past, "if everything went well, it could take 45 seconds to a minute to get onto the [HP] application," Spahn said. "Now it probably takes 20 seconds."

In addition, under the old configuration, "one out of every four times you'd have problems going in to the HP. Now you have a 98% chance of getting in," he said.

David Potter, network administrator at Storage Dimensions, Inc. in San Jose, Calif., reported similar results with the 3000 Connection. The company has about 250 devices attached to a single, logical Novell NetWare-based Ethernet split between two buildings, with a T-1 bridge connecting them, he said.

A problem arose for the company's salespeople after a manufacturing data base was moved from the NetWare servers to an HP minicomputer. The sales staff needed occasional access to that data base as well as to the sales data base, which was still on NetWare servers.

Storage Dimensions tried an HP OfficeShare product to provide personal computer access to the HP minicomputer, but it took about 45 seconds to log on and another minute to get back to NetWare applications.

"The Reflections Network Series allows our users to be simultaneously connected to the HP and to our Novell network," Potter said. "They actually speak two protocols straight from the one network card."

TPC/IP is used to access the HP, and Novell's Internetwork Packet Exchange (IPX) is used for the NetWare server.

Storage Dimensions also has some users outfitted with both the Telnet Connection, which is used to supply links to Unix hosts on the TCP/IP net for access to international E-mail and some engineering applications, and the 3000 Connection. ◼

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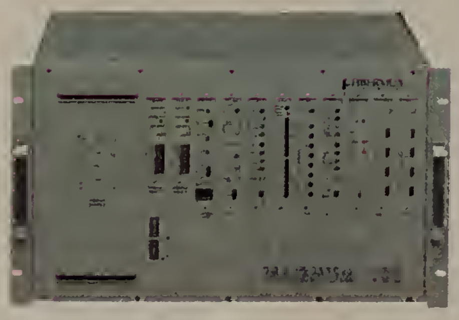

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C. Please Answer ALL Questions, Sign & Date the Form.

1 Industry: (check one only)

01. ☐ Manufacturers (other than computer/communications)
02. ☐ Finance/Banking
03. ☐ Insurance
04. ☐ Real Estate
05. ☐ Healthcare Services
06. ☐ Legal
07. ☐ Hospitality
08. ☐ Retail/Wholesale Trade
09. ☐ Transportation
10. ☐ Utilities
11. ☐ Education
12. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
13. ☐ Government State/Local
14. ☐ Government Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (independent)
18. ☐ Carriers
19. ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/Systems House
22. ☐ Distributor, Computer Related
23. ☐ Distributor, Communications Related
24. ☐ Other ____________________

2 Job function: (check one only)

1. ☐ Networking Management (Responsible for both voice & data)
2. ☐ MIS Management (VP, Dir., Department Head)
3. ☐ Corporate Management (Chairman, President, Owner, General Manager, CEO, CIO, VP)
4. ☐ Data Communications Management (Responsible for data only)
5. ☐ Telecommunications Management (Responsible for voice only)
6. ☐ Financial Management
7. ☐ Engineering Management
8. ☐ Consultant (Independent)
9. ☐ Other ____________________

3 What is the scope of your involvement in purchase decisions for Network/Communications products + services? (check one only)

1. ☐ Enterprise Wide (Organization/Subsidiary/Division)
2. ☐ Multi Enterprise (Consultants)
3. ☐ Department Wide

4 What is the total number of sites for which you have purchase influence?

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1

5 Your primary responsibility: (check one only)

1. ☐ Both Data + Voice
2. ☐ Data Networking Only
3. ☐ Voice Networking Only
4. ☐ None

6 Which transmission media do you use in your network: (check all that apply)

Public:
01. ☐ Switched-Based (DDD, Wats, Megacom, etc.)
02. ☐ Leased Line (not including T-1)
03. ☐ T-1
04. ☐ Fractional T-1
05. ☐ T-3/SONET
06. ☐ Broadband
07. ☐ ISDN

Private:
08. ☐ Satellite
09. ☐ Microwave
10. ☐ Fiber Optic

7 Is your network: (check all that apply)

LOCAL AREA NETWORK
1. ☐ Local (within building)
2. ☐ Local (in a campus environment)

WIDE AREA NETWORKS
3. ☐ International
4. ☐ National
5. ☐ Regional (several states)
6. ☐ Metropolitan

8 What is your network architecture? (check all that apply)

1. ☐ SNA
2. ☐ DECNET
3. ☐ OSI
4. ☐ GOSIP
5. ☐ MAP/TOP
6. ☐ TCP/IP
7. ☐ DCA (UNISYS)
8. ☐ OTHER ____________

9 What is your LAN Operating System? (check all that apply)

01. ☐ 3COM (3+, 3+open)
02. ☐ LOCAL TALK (APPLETALK)
03. ☐ BANYAN (VINES)
04. ☐ DCA (IRMALAN)
05. ☐ IBM (LAN Server)
06. ☐ IBM (PC LAN PROGRAM)
07. ☐ MICROSOFT (LAN MANAGER)
08. ☐ UNGERMAN BASS (NET/1)
09. ☐ NOVELL (NETWARE)
10. ☐ TOPS
11. ☐ PROTEON (PRONET)
12. ☐ OTHER ____________________

10 What is your LAN environment? (check all that apply)

1. ☐ 4M TOKEN RING
2. ☐ 16M TOKEN RING
3. ☐ ARCNET
4. ☐ ETHERNET
5. ☐ STARLAN
6. ☐ FDDI
7. ☐ LOCALTALK
8. ☐ 10BASET
9. ☐ OTHER ________

11 Which operating systems do you utilize? (check all that apply)

1. ☐ IBM DOS (VSE)
2. ☐ UNIX
3. ☐ OS/2
4. ☐ OS/2 Extended Edition
5. ☐ MVS
6. ☐ VM
7. ☐ VMS
8. ☐ XENIX
9. ☐ PICK
0. ☐ OTHER ____

12 Please indicate by vendor the number of mainframes/minicomputers installed in your network.

VENDOR	MAINFRAMES A	MINIS B
01. DEC		
02. IBM		
03. AMDAHL		
04. AT&T		
05. BULL HN IS		
06. NCR		
07. DATA GENERAL		
08. WANG		
09. HEWLETT PACKARD		
10. PRIME		
11. TANDEM		
12. UNISYS		
13. CONTROL DATA		
14. OTHER		

13 Please indicate by vendor the number of microcomputers/workstations:

A. Presently installed in your network.

B. The approximate quantity you plan to install in the next 12 months.

MICROCOMPUTER/ WORKSTATION/ VENDOR	PRESENTLY INSTALLED A	PLAN TO INSTALL NEXT 12 MONTHS B
01. PCs based on 80286 chip		
02. PCs based on 80386 chip		
03. PCs based on 80486 chip		
04. 8086/8088		
05. Macintosh		
06. RISC-based workstations		
07. UNIX-based workstations		

14 What is your planned PC standard? (check all that apply)

1. ☐ EISA
2. ☐ MCA
3. ☐ NUBUS (MACINTOSH)

15 For which areas outside of the U.S. do you have purchasing influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East

16 Check ALL that apply in columns A and B

A) I am presently involved in the purchase process for the following products/services:

B) I plan to purchase the following products/services in the next 12 months:

Presently Involved A	Plan to Purchase B	LOCAL AREA NETWORKS:
01. ☐	☐	Local Area Networks
02. ☐	☐	LAN Servers
03. ☐	☐	LAN Services
04. ☐	☐	Cables, Connectors, Baluns
05. ☐	☐	Bridges, Routers, Gateways
06. ☐	☐	UPS
07. ☐	☐	LAN Storage Devices
A	B	COMPUTERS/PERIPHERALS:
08. ☐	☐	Micros
09. ☐	☐	Minis
10. ☐	☐	Mainframes
11. ☐	☐	Front End Processors
12. ☐	☐	Terminals
13. ☐	☐	Laptops
14. ☐	☐	Printers
15. ☐	☐	Work Stations
16. ☐	☐	Cluster Controllers

(continued on next column)

Presently Involved A	Plan to Purchase B	SOFTWARE:
17. ☐	☐	Network Management
18. ☐	☐	Micro to Mainframe
19. ☐	☐	Network Security
20. ☐	☐	Call Accounting
21. ☐	☐	Distributed DBMS
22. ☐	☐	Communications Software
23. ☐	☐	Applications Software
24. ☐	☐	Network Operating Systems Software
25. ☐	☐	EDI Software
26. ☐	☐	E-Mail Software
A	B	DATA COMMUNICATIONS:
27. ☐	☐	Modems (over 9.6kbps)
28. ☐	☐	Modems (under 9.6kbps)
29. ☐	☐	T-1 Multiplexers
30. ☐	☐	T-3 Multiplexers
31. ☐	☐	Fractional T-1 Multiplexers
32. ☐	☐	Data Switches
33. ☐	☐	Matrix Switches
34. ☐	☐	Packet Switches
35. ☐	☐	Protocol Converters
36. ☐	☐	Network Management Systems
37. ☐	☐	Terminal Emulation Boards
38. ☐	☐	Facsimile Machines
39. ☐	☐	Diagnostic Test Equipment
40. ☐	☐	DSU/CSU
41. ☐	☐	Data Security
42. ☐	☐	Data Compression Equipment
43. ☐	☐	Network Adapter Boards
44. ☐	☐	Microwave
45. ☐	☐	Messaging Software
A	B	TELECOMMUNICATIONS:
46. ☐	☐	PBXs (over 1000 lines)
47. ☐	☐	PBXs (200 - 1000 lines)
48. ☐	☐	PBXs (under 200 lines)
49. ☐	☐	Key Systems
50. ☐	☐	Automatic Call Distributors
51. ☐	☐	Voice Messaging Systems
52. ☐	☐	Video Teleconferencing Systems
A	B	SERVICES:
53. ☐	☐	Switched Voice
54. ☐	☐	Dedicated Leased Line
55. ☐	☐	T-1
56. ☐	☐	T-3
57. ☐	☐	Digital Data
58. ☐	☐	Packet Switched
59. ☐	☐	Centrex
60. ☐	☐	Central Office Lan
61. ☐	☐	Satellite
62. ☐	☐	On-Line Information
63. ☐	☐	ISDN
64. ☐	☐	EMail
65. ☐	☐	VSAT

17 Estimated value of networking equipment and services:

A: Which you helped specify, recommend or approve in the last 12 months?

B: Which you plan to help specify, recommend or approve in the next 12 months?

A	B	
1 ☐	☐	$100 million and over
2 ☐	☐	$50 - $99.9 mill
3 ☐	☐	$25 - $49.9 mill
4 ☐	☐	$20 - $24.9 mill.
5 ☐	☐	$10 - $19.9 mill.
6 ☐	☐	$5 - $9.9 mill.
7 ☐	☐	$1 - $4.9 mill.
8 ☐	☐	$500,000 - $999,999
9 ☐	☐	Under $500,000

18 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ over $10 billion
2. ☐ $1 to $9.9 bill.
3. ☐ $500 to $1 bill.
4. ☐ $100 to $499.9 mill.
5. ☐ $50 to $99.9 mill.
6. ☐ $10 to $49.9 mill.
7. ☐ $5 to 9.9 mill.
8. ☐ under $5 mill.

19 Estimated number of employees for your entire corporation:

1. ☐ over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ under 500

20 Which of the following ISDN products do you plan to purchase in the next 12 months? (check all that apply)

1. ☐ Basic Rate Interface Terminal Adapters
2. ☐ Primary Rate Interface Equipment
3. ☐ Voice/Data terminals
4. ☐ Voice-only terminals
5. ☐ Data-only terminals

21 From which of the following vendors will you consider buying your PBX/Central Office Switch? (check all that apply)

A PBX	B COS	
A ☐	☐	AT&T
B ☐	☐	ALCATEL
C ☐	☐	ERICSSON
D ☐	☐	FUJITSU
E ☐		HARRIS
F ☐		HITACHI
G ☐		ROLM
H ☐		INTECOM
I ☐		MEMOREX TELEX
J ☐		MITEL
K ☐	☐	NEC
L ☐	☐	NORTHERN TELECOM
M ☐		SAMSUNG
N ☐	☐	SIEMENS
O ☐		STROMBERG-CARLSON
P ☐		TOSHIBA
Q ☐	☐	OTHER ____________

NETWORK WORLD
The Newsweekly of Enterprise Networking Strategies
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91NN

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

"If you're implementing an imaging system, get the users involved. They know best. They're the ones dealing with the paper every day, not the technical staff."

Hal Petschke
Image consultant
Aetna Life and Casualty Co.
Hartford, Conn.

Netnotes

ProTools, Inc. has released Version 1.1 of its Protolyzer network monitoring and analysis software. The release offers increased protocol support and a frame editor, and is reportedly easier to use. Protolyzer 1.1 also features a data converter that allows users to pass net monitoring data from Network General Corp.'s Sniffer to Protolyzer for analysis.

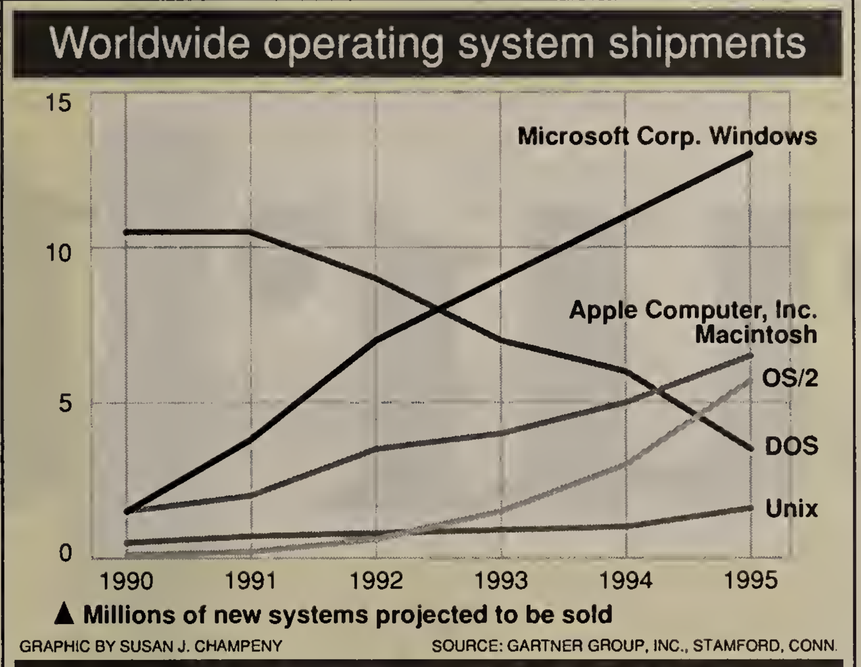
Protolyzer 1.1 adds support for Xerox Corp.'s Xerox Network Systems, Banyan Systems, Inc.'s VINES and the full suite of Transmission Control Protocol/Internet Protocols. Ease of use is provided by a data base that converts hexidecimal code to English, preconfigured settings for monitoring and analysis, and automatic network configuration mapping.

Los Angeles-based **Ultinet Development, Inc.** has brought out BackMan, a backup product for IBM PC LAN, 3Com Corp. 3+Open, IBM LAN Server and Microsoft Corp. LAN Manager local-area networks.

BackMan comes with Ultinet's own Disk+ OS/2 backup software and Sytos Plus from Sytron in Westborough, Mass. It also includes either the Python 1.3G-byte digital audio tape backup unit or the internal Viper 2.0G-byte tape drive, both from Archive Corp., in addition to all other equipment necessary for system backup.

(continued on page 20)

Worldwide operating system shipments



▲ Millions of new systems projected to be sold

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: GARTNER GROUP, INC., STAMFORD, CONN.

Micom adds LAN routing, bridging to Marathon 5K

Compression unit can be used for internet traffic.

By Caryn Gillooly
Senior Editor

ATLANTA — Micom Communications Corp. will announce this week that it has added local-area network bridging and routing support to its Marathon 5K Data/Voice Network Server, a device that enables users to squeeze voice, facsimile and now LAN traffic into a 56K/64K bit/sec link.

Micom's Marathon 5K Server is a self-contained unit into which users plug other equipment. The box uses speech, data and fax compression techniques to reduce the capacity needs for voice and data transmissions.

Traffic compressed by the server has to be decompressed by another Marathon 5K Server at the far end of the line, which breaks the signal down into its component parts and delivers the information accordingly.

With the LAN capabilities, which will be announced here at the DEXPO South 91 trade show, network administrators can allocate up to 38.4K bit/sec of bandwidth to LAN internetwork traffic, said Ken Guy, vice-president of corporate strategies at Micom, based in Simi Valley, Calif.

The Marathon 5K can support any type of LAN and any vendor's bridges, routers or gateways, provided they are interoperable to begin with.

According to Bill Dilfer, director of wide-area network marketing at Micom, the initial thrust behind the Marathon 5K Server was twofold.

"First, we saw a dramatic reduction in [the] cost of digital lines," he said. "It was getting to the point where the cost of analog lines and digital lines were virtually the same."

Second, Dilfer said, was the company's development of its own speech and fax compression technology that would allow more efficient transmission over the slower leased lines.

Micom's speech compression technology reduces signals to about 8K bits — 15% of their typical size — and fax traffic to one-tenth of its original size. The company combined these advances with existing data compression technologies in order to offer a product that could transmit all three types of communications, he said.

> The Marathon 5K can support any LAN and any vendor's bridges, routers or gateways.
>
> ▲▲▲

But Micom's customer base was looking for more.

"Tying in LANs was of great interest to the Marathon 5K customers," Dilfer said. "Now these customers can use the same product to bridge their LANs from remote offices to headquarters over leased lines."

Pricing for the Marathon 5K begins at $2,750. Voice and data expansion modules are available for $1,150 and $1,400 respectively.

A remote terminal server option supporting Ethernet traffic is priced at $2,750. All are available now. ◘

DCA intros multi-LAN gateway to IBM hosts

Firm's Irmalan/EP SNA Gateway lets AppleTalk, NetWare, NETBIOS LANs access IBM hosts.

By Caryn Gillooly
Senior Editor

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) recently announced the Irmalan/Extended Platform (EP) SNA Gateway, a personal computer-based device that will enable Network Basic I/O System-, Apple Computer, Inc. AppleTalk- or Novell, Inc. NetWare-based local-area networks to access IBM hosts.

DCA also released two optional client software packages — Irmalan Windows client for NETBIOS and the Irmalan Macintosh client for NETBIOS — to provide workstations on those LANs with connectivity to Irmalan/EP. Irmalan/EP comes with DOS client software.

The gateway can support one of two dual protocol stack configurations. The first is the AppleTalk and NETBIOS configuration, which enables Macintosh personal computer and Microsoft Windows-based clients to simultaneously access the DCA gateway server. The second is the AppleTalk and Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) configuration, which enables Macintosh and NetWare clients to simultaneously access the server.

Before the release of the Irmalan/EP Gateway, DCA offered Irma Workstation Window and MacIrma products that gave stand-alone Macintosh and Microsoft Windows-based machines access to IBM hosts. The firm did not offer NetWare support.

"More and more customers have mixed desktop environments and LAN operating systems," said Virginia Lenahan, Irmalan/EP product manager for DCA, based here. "So we took the current Irmalan products and rolled them into one offering that can handle multiple protocol stacks."

Three gateways in one

The Irmalan/EP gateway includes all the functionality previously found in DCA's Irmalan Synchronous Data Link Control Gateway, Irmalan 802.2 Token-Ring Gateway and Irmalan Dis-

(continued on page 20)

Alfalfa messaging ware supports X.400, Internet

By Eric Smalley
Senior Editor

CAMBRIDGE, Mass. — Alfalfa Software, Inc. last week released an electronic messaging application for Unix systems that supports both the Internet and the X.400 messaging standard.

The application, called Poste, allows users to send documents — including text, spreadsheets, facsimiles, graphics and sound files — in a single electronic mail message. When a message is received and the accompanying document is accessed, the application software necessary to work on the document — be it a word processing package or a spreadsheet application — can be invoked automatically.

Poste supports the X Window System and the Open Software Foundation's Motif graphical user interface. The software also provides templates that make it easier to use complex Internet and X.400 addresses. Users put messages in folders and can sort, query and cross-index them.

Poste is based on a client/server architecture with message storage and user agent components, allowing users to create bulletin boards and mailboxes shared by work groups.

As Unix becomes more widely accepted in the commercial market, users are looking for commercial-grade applications, said Alfalfa President Paul Madden.

Though comprehensive office automation packages that combine E-mail, word processors and spreadsheets have been available for Unix, users want to purchase individual applications from different vendors in the manner they have been able to buy DOS applications, he claimed. Poste will enable customers to do that.

Poste is currently available for The Santa Cruz Operation, Inc.'s SCO Unix, Sun Microsystems, Inc.'s SunOS, Digital Equipment Corp.'s Ultrix and MIPS Computer Systems, Inc.' MipsOS. Single-user licenses cost $395. ◘

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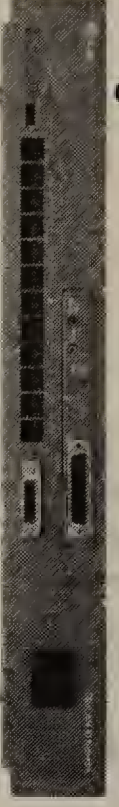
Security.



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A LAN is a LAN. Right? Wrong. The AT&T StarLAN 10 SmartHUB is more secure, easier to manage, and a better investment than any other Ethernet® hub. Read on to learn why.

Data Security. Ethernet LANs are by nature very accessible – sometimes too accessible. Idle users and hackers always find ways to pick off passwords and other private information from unsecured networks. But our StarLAN 10 SmartHUB foils intruders and stymies eavesdroppers, thanks to its ability to store and analyze a distinctive address for every device in your network. This unique security system selectively scrambles data – preventing people from intercepting information that isn't meant for them – and notifies the system administrator should unauthorized users attempt to transmit. And only the AT&T StarLAN 10 SmartHUB has it.

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	AT&T	Cabletron Systems	SynOptics™ Communications
Ports Locking	Yes	Yes – MMAC-3 No – MRXI-2	Yes
Intrusion Control	Yes	Yes – MMAC-3 No – MRXI-2	Yes
Eavesdrop Prevention	Yes	No	No
Map Generation	Yes	Yes	Yes
User Movement Alarming	Yes	No	Yes
List Price/Port*	SmartHUB $253	MMAC-3 $391 MRXI-2 $338	LattisNet® Series 3030 $525 LattisNet® 2310 $319

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AT&T
Computer Systems

Mountain backup system supports OS/2, Netware

By Timothy O'Brien
West Coast Bureau Chief

CAMPBELL, Calif. — Mountain Network Solutions, Inc. recently announced two new versions of its FileSafe tape backup software, one of which supports the OS/2 operating system while the other can be used with the latest versions of Novell, Inc.'s NetWare.

FileSafe OS/2 Version 1.1-SCSI is one of the first tape backup systems supporting OS/2, and FileSafe Version 5.2.2-SCSI is designed to be used with DOS-based NetWare 2.2 and 3.11 servers. Both products are based on the Small Computer System Interface (SCSI) technology.

The FileSafe products, which are fully compatible and offer a consistent user interface, allow users to choose full or selective backup. Customers can also program the software to run unattended backup operations.

Since the new OS/2 version of FileSafe is fully compatible with both the DOS version of FileSafe and existing Mountain Network Solutions tape subsystems, users can also employ it as a tool to migrate data files from DOS to OS/2 on personal computers or local-area networks.

> "There haven't been many tape backup solutions for OS/2 users yet because nobody was sure of the OS/2 market," Stromska said.
>
> ▲▲▲

"There haven't been many tape backup solutions for OS/2 users yet because nobody was sure of the OS/2 market," said Dan Stromska, Mountain Network Solutions' FileSafe product line manager.

Stromska anticipates that other vendors will begin issuing OS/2 products because IBM is still aggressively promoting that operating system. He said he believes that despite IBM's support of Novell's NetWare announced two months ago, IBM LAN Server installations will continue to grow.

In addition, Stromska said there has been little demand for support of Microsoft Corp.'s LAN Manager installations.

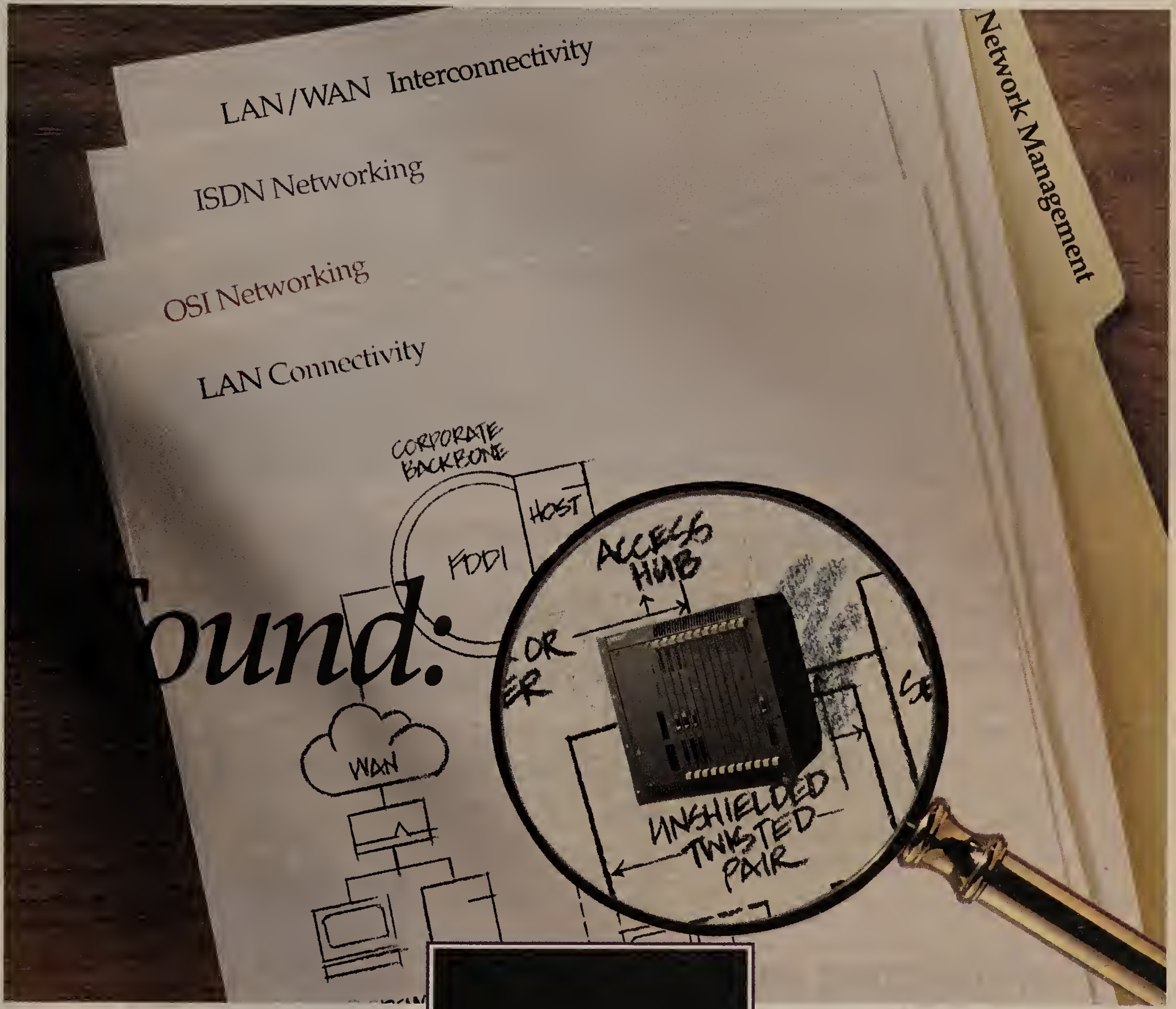
FileSafe OS/2 Version 1.1-SCSI software, working as a protected mode or windowed application, provides full tape backup support for servers and workstations running IBM's OS/2 (Versions 1.2 and 1.3), Microsoft's OS/2 (Version 1.2) and the IBM LAN Server (Version 1.2).

With FileSafe 5.2.2-SCSI, the NetWare bindery, which is the operating system directory, can be completely backed up and restored. In addition, trustee lists and access privileges can be backed up to the file level.

FileSafe software works with Mountain Network Solutions' ¼-in., SCSI 4mm digital audio tape and 8mm helical scan tape backup subsystems, which range in capacity from 250M bytes to 2.2G bytes.

As a separate software release to work with Mountain Network Solutions' tape drive subsystems, FileSafe OS/2-SCSI costs $179 and is available now directly from the company. The FileSafe 5.2.2-SCSI software is available through the vendor's bulletin board service free of charge. Existing users that require diskettes and manuals for the upgrade will be charged $37.50.

Mountain Network Solutions is also expected this fall to deliver a new data management program that will help users move data across an enterprise network comprising different operating systems and hardware platforms. ◪



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DCA intros LAN gateway to IBM hosts

continued from page 17

tributed Function Terminal (DFT) Gateway.

The SDLC Gateway is a combination hardware/software package that lets IBM NETBIOS LAN clients emulate an IBM 3274 or 3276 controller for communications with an IBM front-end processor over a synchronous modem link.

The Token-Ring Gateway is a software-only product that gives clients direct access to an IBM host through an IBM Token-Ring Network directly connected to an IBM communications controller.

The DFT Gateway supports multisession microcomputer-to-host links. The personal computer-based DFT Gateway can be configured to support as many as four attached microcomputers, with each handling five simultaneous host sessions.

The Irmalan/EP gateway will support all of these capabilities and the three current gateways will be phased out, according to DCA.

Smooth transition

As a software-only product, the Irmalan/EP will make it easier for customers to accommodate change. Previously, if a customer wanted to change from a coaxial-based environment to a Token-Ring environment, for example, new hardware and software would have been required. With Irmalan/EP, customers need only change the interface cards; either connection will be supported through the software.

> As a software-only product, the Irmalan/EP will make it easier for customers to accommodate change.
>
> ▲▲▲

"Before, DCA didn't separate the hardware and software purchases," said Cindy Santisario, a senior research analyst at International Data Corp. in Framingham, Mass. "This platform is much easier to grow with."

Irmalan/EP, which includes the gateway and DOS client software, will be licensed for eight, 32, 64 or 128 concurrent users and is priced from $1,495 to $7,495.

The Irmalan Macintosh client and Irmalan Windows client both cost $3,995 per Irmalan/EP gateway. The Irmalan/EP and Irmalan Macintosh clients will be available in May, while the Irmalan Windows client will be available in June.

Current users of Irmalan Gateway Servers will be able to upgrade to Irmalan/EP for $295 per gateway. ◘

Netnotes

continued from page 17

The Sytos Plus software can reside on an OS/2 server or an OS/2 workstation, where it backs up the file server to an OS/2 workstation or to the tape drive on the server. Disk+ runs on local DOS workstations and lets Sytos Plus back up local hard drives to the Archive tape drive. BackMan enables the administrator to perform attended or unattended backup.

BackMan is available now. Prices range from $3,257 to $6,727, depending on configuration.

David Systems, Inc. recently unveiled a line of wiring hubs based on a new architecture it calls the ExpressBus Architecture. As a result of the new setup, its new ExpressNet Concentrators can simultaneously support as many as 10 independent local-area network segments.

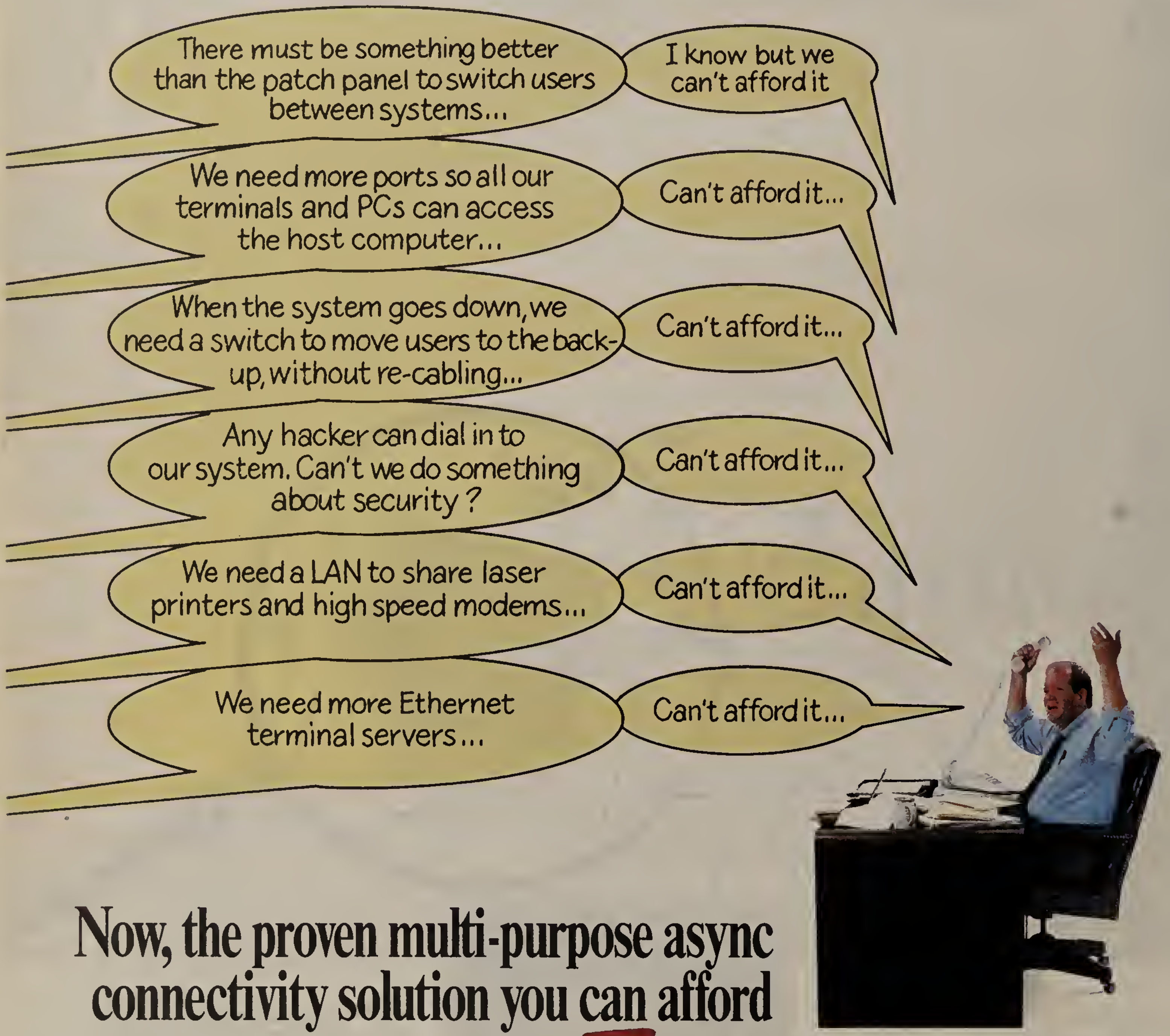
The ExpressBus Architecture lets a network administrator configure a single concentrator to support four Ethernet, four token-ring and two Fiber Distributed Data Interface network segments. Previously, the concentrators could only support one Ethernet segment. According to the company, the existing ExpressNet Concentrator interface modules, such as the 10Base-T Twisted Pair Module, can be used with the new concentrator.

"Important to current David [Systems] users is that in providing this new capability, we've taken an approach that does not strand our installed base," said Henry Nothaft, president and chief executive officer of David Systems, based in Sunnyvale, Calif.

However, new modules — such as a 10Base-T Twisted Pair Module for ExpressBus, Token-Ring Module for ExpressBus and Fiber Optic Inter-Repeater Link (FOIRL) Module — will be available for the new concentrators in the third quarter for users wishing to upgrade.

David Systems is also offering a Supervisor Module with the ExpressBus-based concentrators that provides a single point of management for all devices connected to any of the segments. According to the company, support for the Simple Network Management Protocol is available as an option for the Supervisor Module.

Prices for the basic ExpressNet Concentrators are $1,495 for a five-slot and $1,995 for a 12-slot model. The Supervisor Module with ExpressBus support costs $2,995. The 10Base-T Twisted Pair Module is priced at $1,700, the Token-Ring Module costs $2,000, and the FOIRL Module costs $2,895. All products are expected to be available in the third quarter. ◘


There must be something better than the patch panel to switch users between systems...
I know but we can't afford it
We need more ports so all our terminals and PCs can access the host computer...
Can't afford it...
When the system goes down, we need a switch to move users to the back-up, without re-cabling...
Can't afford it...
Any hacker can dial in to our system. Can't we do something about security?
Can't afford it...
We need a LAN to share laser printers and high speed modems...
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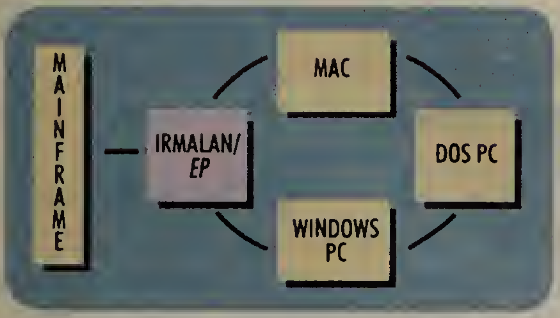

With IRMALAN/EP 3270 gateway, you can support DOS, Mac and Windows clients with a single gateway.

With this single gateway, you can now support DOS, Mac and Windows clients. And it's also designed for IBM® NETBIOS, Novell®'s IPX/SPX protocol* and AppleTalk®.

And by supporting multiple platforms on your LAN, IRMALAN/*EP* eliminates the need to purchase more than one gateway. That's a cost savings that puts it far above anything offered by the competition.

But that's not all. IRMALAN/*EP* comes with RamXpander,™ our memory manager that allows fully featured emulation in less than 40K of resident memory.

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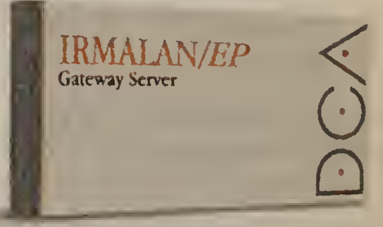
We've even made it easy to purchase IRMALAN/*EP* by including DFT, SDLC and 802.2 token-ring gateway software under NETBIOS, NetWare® and AppleTalk all in one package. So now, migrating to different gateway technologies won't cost a thing.

To get you up and running, the DOS client is also included. To extend your platforms, just add software for Macintosh and Windows users depending on your needs.

So now that there's only one gateway decision, just call DCA at 1-800-348-DCA-1, ext. 70R, to receive free information with further details on connecting your mixed LAN environments to the mainframe.

Or better yet, just call your reseller to order IRMALAN/*EP* today. Because with our new single gateway solution, now there's no need for you to even think twice.



DCA

*Windows client software is not yet available for the Novell IPX/SPX protocol. ©1991 Digital Communications Associates, Inc. All rights reserved. DCA is a registered trademark and IRMALAN, MacIRMALAN, IRMA, and RamXpander are trademarks of Digital Communications Associates, Inc. All other brand and product names are trademarks or registered trademarks of their respective owner.

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MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Dialogue

Do you think Congress needs to establish a national policy for caller identification services?

"Yes. I prefer to see a nationwide mandate where provisions are put in place that prohibit [state] governments from restricting new technologies, such as caller ID.

"I don't sympathize with the alleged invasion of privacy argument that often surfaces when discussing caller ID. The benefits of being able to use caller ID to develop business applications or eliminate unwanted telephone calls certainly outweigh concerns that the service would reveal private telephone numbers."

Larry Ehlers
Manager of telecommunications
Bendix/King
Olathe, Kan.

"There are difficult privacy issues involved, and users must be very sensitive to those issues before they can make an informed decision to support the service or not. Basically, we still need more information."

Stanley Welland
Manager
Corporate telecommunications
General Electric Co.
Bridgeport, Conn.

"Yes. I can't understand the reasoning for a state banning [automatic number identification]-type services. It's new and progressive, and something that can be used to help business as well as residential users."

Gary Henkel
Director of telecommunications
Time Customer Service, Inc.
Tampa, Fla.

"It's a very divided issue. There are traders here who are all for [automatic number identification], but then there are just as many who strongly oppose it. Those against it view it as a privacy issue; they want to be able to make their cold calls without people taking the information for marketing information. On the other side, they see it as a convenience issue, where they can screen their calls. So we as a company haven't come up with a stance on caller ID."

Chuck Garrison
Vice-president
Telecommunications
Chicago Board
Options Exchange
Chicago

Pontiac employs net service to boost customer loyalty

Offers toll-free assistance for car owners, dealers.

By Maureen Molloy
Staff Writer

PONTIAC, Mich. — Facing increased competition and a deep recession in the auto industry, Pontiac Motor Division is pushing to increase sales with the help of a new network service designed to improve customer satisfaction.

Pontiac has established a nationwide customer service center at its headquarters here that customers, dealers and mechanics can call toll free to resolve problems and obtain technical help. Since the center began operating five years ago, the automaker has seen a steady increase in its customer satisfaction index.

"Our strategy is simple," said Charlene Curry, Pontiac's national customer service manager. "If we want to be in business down the road, we must address not only the initial quality of our product, but service as well. What's going to differentiate automakers in the future is customer satisfaction. How the customer is treated as an owner is going to be the key to survival."

The Pontiac Assistance Center (PAC) is part of the company's long-term strategic plan to translate improved customer service into additional sales. The company is betting that increased customer loyalty and product satisfaction will help it achieve its goal of boosting sales by 7% a year.

> "If we want to be in business down the road, we must address not only the initial quality of our product, but service as well."
>
> ▲▲▲

The PAC system enables customers and dealers to quickly reach one of more than 150 Pontiac representatives trained specifically to resolve customer complaints. Last year, the center responded to more than 500,000 calls.

Pontiac uses AT&T's Megacom 800 service and an AT&T Definity Generic 1 private branch exchange with automatic call distribution (ACD) capabilities to process and route calls as they are received to appropriate representatives. Four T-1 lines link Pontiac to AT&T's network.

AT&T worked with General Motors Corp.'s Electronic Data Systems to design and implement PAC.

The Definity's ACD routes incoming calls to one of five assistance areas — one each for customers, dealers, fleet owners, service technicians and a 24-hour roadside assistance program.

> "PAC is one of our key strategies for promoting customer loyalty and [helping] to ensure they come back to buy another Pontiac."
>
> ▲▲▲

The center has proven to be a boon for mechanics, who can call PAC for immediate answers to technical problems. When a technician reports that a particular procedure worked, the solution is added to Pontiac's fix file, a data base containing information on which procedures solved various service problems. All GM divisions have access to the fix file data base, which has been standardized on an IBM mainframe.

Prior to PAC, customers who could not obtain satisfaction from their local dealer had little luck contacting a Pontiac representative for assistance, said Michael Ball, Pontiac's supervisor for accounts support. Their sole recourse was to try to contact one of 27 zone offices located in major cities throughout the country.

"Customers [had to operate] in the Dark Ages before, and to get to us, they had to call one of the zone offices — which had one line coming into it — or write letters to us and raise hell," Ball said. "This old system was a surefire recipe for losing customer loyalty."

As evidence of senior management's full support of the project, PAC is located on the same floor as the executive offices at Pontiac headquarters.

"PAC is one of our key strategies for promoting customer loyalty and [helping] to ensure that when they need a new car, they come back to buy another Pontiac," Curry said. ■

Total quality management

IS initiatives for Sara Lee Hosiery's quality program

1. Introduce IS staff to total quality principles and how they apply to IS operations.
2. Develop departmental plans to improve customer service.
3. Improve application development methodology.
4. Improve teamwork and unity within the department.
5. Develop a new performance reward system that aligns with corporate values and goals.
6. Determine how to publicize successes.
7. Decide how to ensure that IS initiatives are aligned with corporate values.
8. Determine ways to empower employees.
9. Develop new ways to measure quality improvements.
10. Cultivate management commitment to total quality.

IS = Information systems

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: SARA LEE HOSIERY, WINSTON-SALEM, N.C.

IS group puts refined quality plan to work

New focus for Sara Lee Hosiery's total quality program makes it valuable tool for systems dept.

By Wayne Eckerson
Senior Editor

WINSTON-SALEM, N.C. — While many companies have launched total quality programs with fanfare, few have found it easy to make them pay off as promised — particularly in service units such as information systems (IS) and network departments.

Part of the problem is that most total quality programs are designed for use in manufacturing sectors, where production processes and outputs are more easily defined and measured than in service areas. For example, the metrics used to measure the quality of a production run on an assembly line are unsuitable for measuring intangibles such as the quality of customer service.

In addition, companies are finding that quality programs require a fundamental change in corporate culture, a difficult task that requires long-term commitment from top management in order for it to succeed.

Sara Lee Hosiery, which makes women's hosiery under the L'eggs and Hanes labels, initiated a companywide quality program three years ago that never lived up to top management's expectations.

But instead of scrapping the effort, the company, based here, relaunched the program last year.

The new initiative focuses more on customer service and provides training designed to help IS, networking and other service departments understand how to apply total quality concepts to their work.

During the initial quality effort, Sara Lee Hosiery's IS group established quality teams to examine ways the department could improve productivity. But according to Larry Paul, director of IS and technology at the company, that was the wrong way to approach the problem.

Larry Paul

"We had marginal success because our quality teams focused on improving productivity, not quality," Paul said. "Producing the wrong things faster doesn't help. The key is to focus on the things that increase customer satisfaction and then apply productivity tools to enhance those processes."

According to Sara Lee Hosiery's IS customers, the IS group made negligible improvements during its first try to develop applications correctly and respond more quickly and effectively to customer problems, Paul said.

He also noted that the training

(continued on page 24)

IS group uses quality principles to tackle application problems

WINSTON-SALEM, N.C. — Three years ago, the information systems (IS) group responsible for developing applications for Sara Lee Hosiery's distribution centers was plagued with service quality problems.

It had a large backlog of applications, spent more than a third of its time fixing bugs in existing programs and had an adversarial relationship with its distribution center customers, according to Larry Paul, director of IS and technology at Sara Lee Hosiery here.

Paul, who headed the IS distribution center application group at the time, applied Sara Lee Hosiery's companywide quality management principles and methods to address the problems in his department (see "IS group puts refined quality plan to work," page 23).

To start, Paul and his IS group reviewed a log sheet that listed and described every problem and placed each in one of six categories: measurement, materials, machinery, methods, environment and people.

After the IS group ranked the problems in order of importance, it followed up by developing plans of action to address the problems that it found to be most significant.

As a result of this quality management process, the IS group was able to eliminate inconsistencies in its work processes and reduce by nearly 80% the time it spent reworking applications, Paul said.

Some of the internal changes were small but had a large impact.

For example, the group hung a bulletin board in the office for IS staffers to schedule programming jobs. That action helped the group avoid competition for the same resources.

The IS group also began using a checklist for developing applications on a midrange computer and, in doing so, improved the reliability of programs.

"We proved that total quality management could work in IS," said Paul, who now coordinates the quality effort for all of the company's IS departments.

— *Wayne Eckerson*

IS group puts refined quality plan to work

continued from page 23

IS received in the quality program was geared toward manufacturing, not service organizations.

Quality consultants taught IS staffers to measure work processes using statistical control methods, which proved problematic because IS didn't have clearly defined work processes and statistical measures aren't easily applied to nonmanufacturing processes.

"Like many service organizations, we never took the time to define our work processes, unlike a manufacturing environment, in which it's an absolute requirement," Paul said.

To restart the company's flagging quality initiative, Sara Lee Hosiery's management last year issued a new mission statement and a set of guiding values and principles. The IS group, under Paul's leadership, then developed its own mission statement and values that reflected the corporate vision. It also defined 10 quality initiatives that it is ranking in terms of importance and developing action plans for each (see graphic, page 23).

> "For IS to focus on something other than technology requires a paradigm shift in outlook."

▲▲▲

One of the more important initiatives the IS group is tackling is to create new performance measures based on customer needs and expectations. For example, instead of measuring performance by system uptime or availability (such as 99.8%), IS may want to develop measures that record the impact of outages on user businesses, Paul said.

The IS staff will soon be attending training classes in which they will be taught the philosophy and importance of quality management and be given practical guidelines for implementing quality principles within IS. This training, he said, will help drive home the importance of focusing on quality and customer service.

"For IS to focus on something other than technology requires a paradigm shift in outlook," Paul said. "Implementing quality systems takes training and time."

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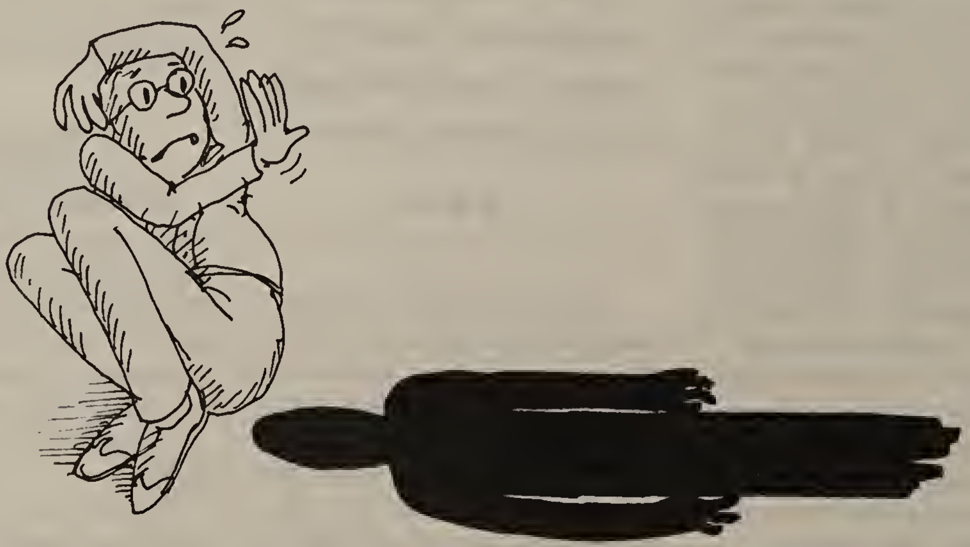

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World News

US Sprint Communications Co. last week began offering international 56K bit/sec, fractional T-1 and T-1 private-line service to Norway and Sweden.

According to a spokesman, US Sprint is also offering 2.048M bit/sec European T-1 service to Norway and Sweden via its New York international gateway. Private lines to the two countries will be routed over the Private Trans-Atlantic Telecommunications fiber cable, the American half of which is owned by US Sprint.

The spokesman said pricing for US Sprint's international private-line service to Norway and Sweden is the same as US Sprint's existing Clearline tariffs for private-line service to Europe.

Lynx Technologies, Inc., a Little Falls, N.J., consultancy, said US Sprint's transatlantic T-1 rates are currently the lowest standard transatlantic fiber-optic T-1 rates tariffed by any U.S. carrier, exclusive of volume and term discounts.

According to recent reports in *China Daily*, **China's Ministry of Posts and Telecommunications** has announced plans to install six cross-country fiber-optic cable lines before the end of the Eighth Five-Year Plan (1991-1995).

The telecommunications ministry said four of the six lines will be installed in south China, including one linking Fuzhou, Guangzhou, Hangzhou and Shanghai. The central government has pledged mon-

(continued on page 28)

The top 10 international calling countries

Country	Number of outgoing international calls per year	Country	Number of outgoing international calls per year
1. Germany	617 million	6. Belgium	144 million
2. U.S.	466 million	7. Spain	135 million
3. Liechtenstein	198 million	8. Japan	121 million
4. Netherlands	186 million	9. Hong Kong	113 million
5. Australia	149 million	10. Singapore	93 million

Rankings as of Jan. 1, 1989; 106 countries were surveyed.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: AT&T'S *THE WORLD'S TELEPHONES*

Digital-on-demand service introduced by WorldCom

Fractional T-1 will be available to Puerto Rico.

By Barton Crockett
Senior Editor

NEW YORK — World Communications, Inc. (WorldCom) last week introduced an international network service that enables users to acquire fractional T-1 bandwidth between the U.S. and Puerto Rico on an hourly basis.

With its new Customized Bandwidth Service, WorldCom joins the growing cadre of U.S. carriers offering international digital bandwidth in half-hour or hourly chunks. Carriers claim that these services are well suited for applications such as international videoconferences.

"This service is very cost-effective for a company that wants to use this bandwidth for 40 hours or less [per month]," said Dianne Hill, a WorldCom marketing manager.

Users will access WorldCom's new Customized Bandwidth Service via dedicated links to WorldCom points of presence in Miami, San Juan, Puerto Rico, and here. WorldCom will charge $170 per hour for 112K bit/sec of capacity between New York and San Juan and $95 per hour for 56K bit/sec of bandwidth between the two cities.

WorldCom officials added that they plan to introduce Customized Bandwidth Service to the U.K. in the third quarter of this year in conjuction with Mercury Communications, Ltd. Pricing for the U.K. service has not been finalized.

WorldCom began offering Customized Bandwidth Service to Italy on a trial basis with a handful of customers in January, the officials said. WorldCom charges $54 per hour for a 64K bit/sec channel between New York and Italy. This charge must be added to charges from the Italian carrier, ItalCable.

According to AT&T, ItalCable charges 2.5 million lire ($19,350 U.S.) per hour for international T-1 capacity to Italy. Further details about ItalCable's service could not be obtained by press time.

Hill said that users should order bandwidth from WorldCom at least 48 hours in advance. She said users may be able to obtain bandwidth on shorter notice but

(continued on page 28)

Lynx ready to enter int'l resale market

Firm will sublease transatlantic digital private lines at rates far below those of current carriers.

By Barton Crockett
Senior Editor

LITTLE FALLS, N.J. — Network consultancy Lynx Technologies, Inc. recently disclosed plans to resell network services between the U.S. and Europe.

Jonathan Ogilvie, director of network services for Lynx's new international resale operation, said the company has already signed up three users that will begin leasing transatlantic digital private lines in September. These circuits will be provisioned on 8M bit/sec of bandwidth that Lynx is leasing on fiber cables between New York, London and Brussels, Belgium.

Lynx is positioning itself as one of the first companies to enter the international resale market, which could take off in the years ahead. Many users and consultants claim that international resellers could significantly undercut existing international service prices.

> Resale "will change international communications in ways not conceived of now."
>
> ▲▲▲

Historically, resale has been prohibited internationally. But many countries, including the U.K., are now moving to drop international resale restrictions, spurring companies such as Lynx to enter the market.

"I think it's a great market," Ogilvie said. "[Resale] will change international communications in ways not even conceived of now."

Other countries that have dropped international resale restrictions or are expected to do so include Canada and Australia. Pressure for similar reforms is building in Hong Kong.

Announcement pending

Ogilvie said Lynx plans to formally announce its international resale service this month. At that time, the company will disclose plans to sublease end-to-end transatlantic 64K bit/sec circuits to users for about $4,000 to $5,000 per month.

Currently, carriers charge about $7,500 per month for end-to-end 64K bit/sec circuits between the U.S. and U.K., and between the U.S. and Belgium.

Ogilvie added that Lynx will lease circuits to users at speeds above and below 64K bit/sec and also will provide international switched services. He said more details about Lynx's international resale service will be released at the formal service introduction.

But observers warn that while international resellers should be able to undercut existing prices, major carriers may respond by reducing prices further and forcing the resellers out of business.

Critics also argue that international resale could attract unstable companies that will go out of business and leave users with downed networks. The fate of one early international reseller,

(continued on page 28)

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—Larry Uline,
Manager, Technical Support
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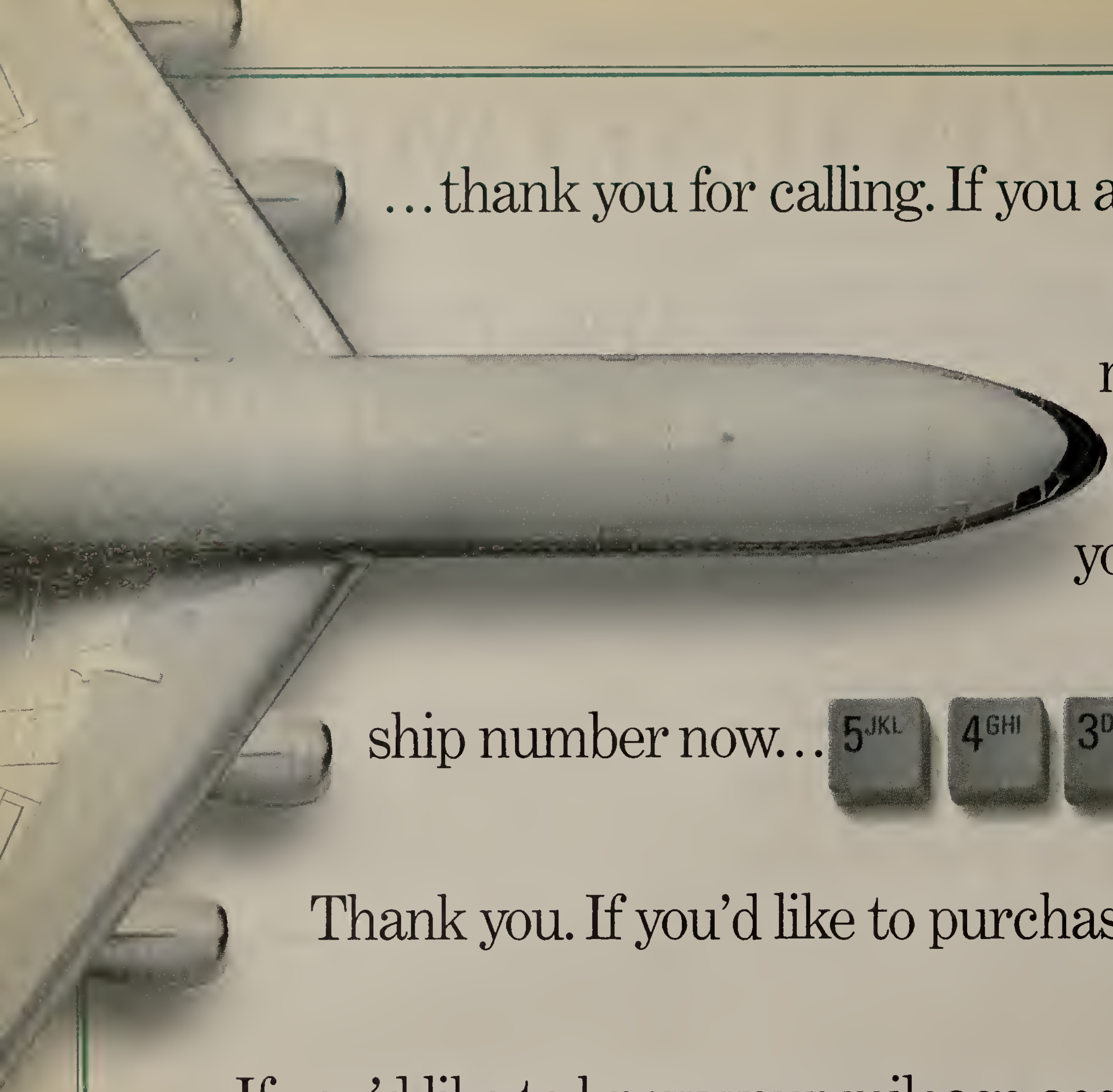

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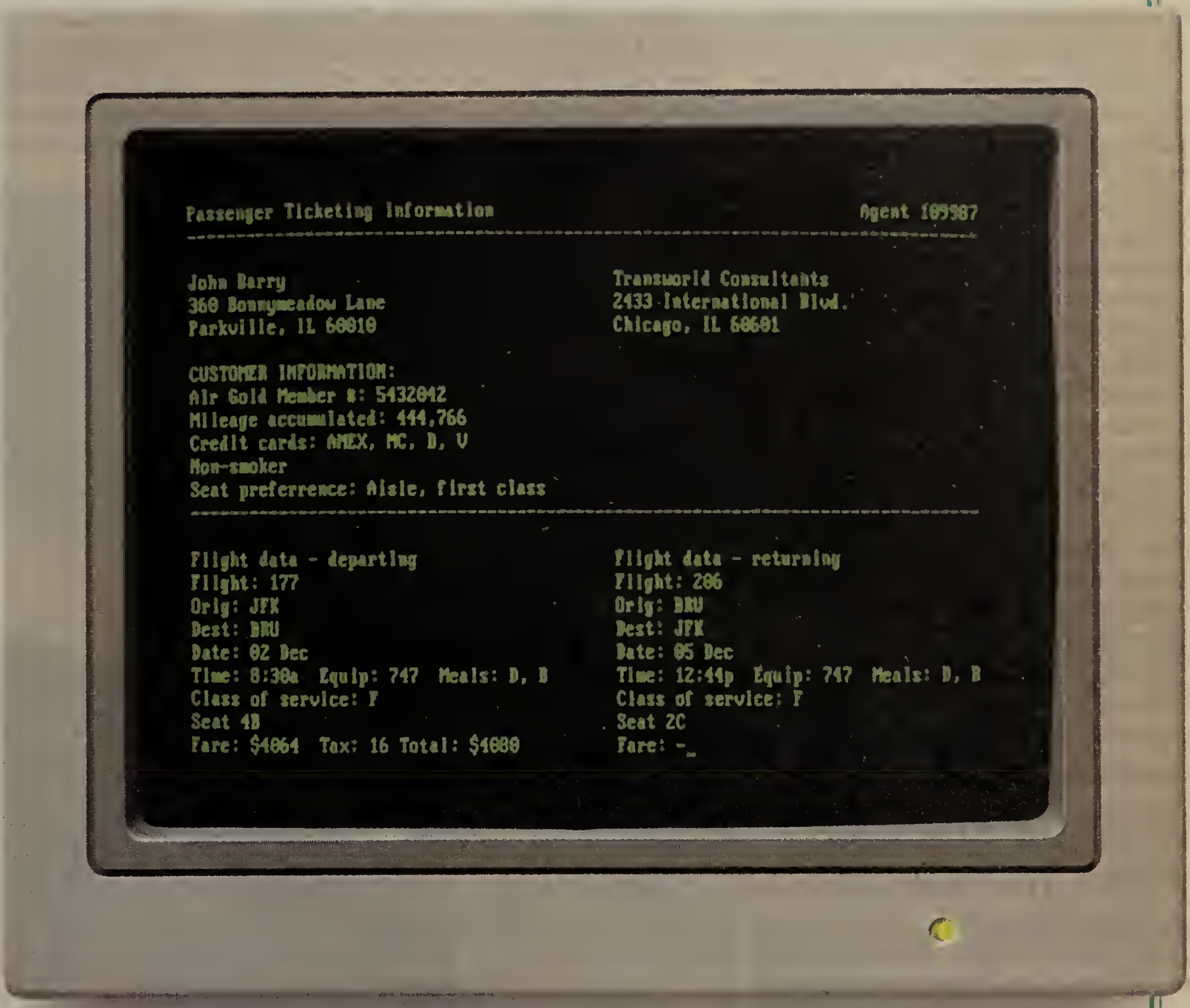

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Passenger Ticketing Information                                   Agent 109987
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John Barry                                  Transworld Consultants
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CUSTOMER INFORMATION:
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Mileage accumulated: 444,766
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Seat preferrence: Aisle, first class
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Flight data - departing                     Flight data - returning
Flight: 177                                 Flight: 206
Orig: JFK                                   Orig: BRU
Dest: BRU                                   Dest: JFK
Date: 02 Dec                                Date: 05 Dec
Time: 8:30a  Equip: 747  Meals: D, B        Time: 12:44p  Equip: 747  Meals: D, B
Class of service: F                         Class of service: F
Seat 4B                                     Seat 2C
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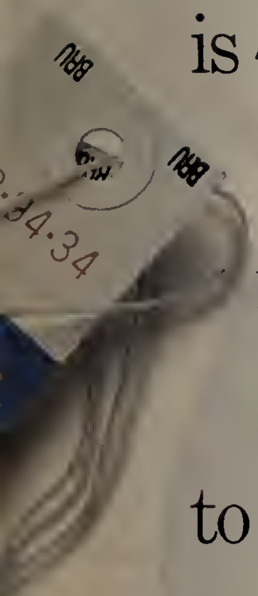

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Lynx ready to enter int'l resale market

continued from page 25

Securities Communications Networks, Inc. (SCN) in New Canaan, Conn., appears to reinforce those concerns ("Start-up to sell cut-rate int'l lines," *NW,* Aug. 27, 1990).

SCN began reselling private-line service between New York and London late last year. But even though the company raised about $3 million in venture capital and began providing service to two customers, it was forced to halt operations last month because it ran out of money. Gregory Olinyk, SCN's president and chief executive officer, said he is now trying to raise funds to restart operations.

Ogilvie, who worked with SCN before moving to Lynx last month, said Lynx will avoid SCN's fate because it will not commence service until it has enough customers to cover its fixed costs.

He added that Lynx will be more stable than SCN because its international network consulting and tariff research business will provide additional revenue streams that will help cushion the expense of starting the international resale operation.

Even though SCN ran into financial problems, users said its experience indicates that resellers can provide users with good service.

"I think it was a good service," said Mark Toms, group manager of communications and data processing at Cresvale, Ltd., a securities trading company in London. "We had no problems. It was stable, effective and efficient."

Toms said Cresvale leased a transatlantic 64K bit/sec circuit from SCN for about 30% to 35% less than the pricing other carriers offered. He said his firm's circuit came down briefly when SCN stopped operations but was quickly restored on facilities from Mercury Communications, Ltd. and World Communications, Inc.

Jeffrey Weinstock, controller at Mercadian Capital, LP in Jersey City, N.J., said he received excellent service on the transatlantic 128K bit/sec circuit his firm leased from SCN. "I can't say enough for the company," Weinstock said. "They were great for us." ◪

World News

continued from page 25

ey to cover 12,000 km of fiber cable, while local governments will pay for the installations of another 10,000 km of fiber cable.

France recently awarded licenses to operate the French portion of a future European digital mobile phone system to **France Telecom** and **Societe Francaise de Radiotelephonie (SFR).**

The European digital mobile phone system will allow subscribers to make calls across national borders. Both France Telecom and SFR already operate analog mobile-phone networks in France.

The digital network will open next year, with the aim of covering 70% of the French population by 1995.

France Telecom is the state-owned operator of the country's fixed-line telephone network. SFR is a subsidiary of Cie Generale des Eaux.

Their license for the digital cellular phone network will run for 15 years. The French government said the country's digital mobile-telephone market should reach four million subscribers by 2000 and could become the most important national market in the European network.

France Telecom has agreed to order 100,000 phones adapted for the digital system between now and 1992, while SFR has undertaken to order a similar number between now and 1996. The ministry stip-

Digital-on-demand service introduced

continued from page 25

that extra service charges would be levied.

WorldCom's Customized Bandwidth Service is similar to services from other carriers. For example, AT&T's International Accunet Reserve Digital Service (IARDS) enables users to obtain international T-1 circuits on a half-hourly basis between the U.S. and 19 other countries.

IARDS is available from the U.S. to Italy and to the U.K. but not from the U.S. to Puerto Rico. AT&T charges $450 per half hour for service to the U.K., which must be added to British Telecommunications PLC's charges of £650 ($1,100 U.S.) per hour.

IARDS does not support fractional T-1 speeds. But Manuel Sieira, an AT&T international product specialist, said users can obtain fractional T-1 speeds by using AT&T's Switched Digital International (SDI) service, which supports dial-up, 56K and 64K bit/sec service to 10 countries. Users pay $2.76 for the first minute of SDI service to Europe and $2.30 for each additional minute.

US Sprint Communications Co.'s Global Virtual Private Network service, due to debut in May, will also support international, switched 64K bit/sec links.

International carrier TRT/FTC Communications, Inc. last fall began offering per-hour access to fractional T-1 and T-1 bandwidth to the U.K. last fall, according to Sharyn Yensko, a manager of product marketing at the company. TRT/FTC offers the service at rates of 256K, 384K and 768K bit/sec as well as T-1.

Yensko said TRT/FTC charges $400 per hour for a 256K bit/sec circuit to the U.K., which must be added to charges of £200 ($338 U.S.) per hour from Mercury Communications. ◪

ulated that the licensees should buy phones made in Europe.

Currency fluctuations and a sharp fall in European and U.S. demand played an important role in creating the poor 1990 earnings results for Italy's **Ing. C. Olivetti & Co. S.p.A.**, according to the company.

In the firm's fourth consecutive year of declining profits, net profit last year sank to 60.4 billion lire ($47.1 million U.S.) from 202.8 billion lire ($158 million U.S.) in 1989. Nevertheless, Olivetti was still the only major European-owned computer maker to post any profits in 1990.

Revenue for the first four months of 1991 dropped 4% over last year's figures. Revenue last year totalled 9,037 billion lire ($7.1 billion U.S.), compared with 9,031 billion lire ($7 billion U.S.) in 1989.

The company's restructuring plan, including a package of job reductions and early retirement for 7,000 employees, also had a negative impact on Olivetti's results

Trustee Savings Bank of Dublin recently said it purchased a Stratus Computer, Inc. XA 2000 transaction processor that will anchor its automated teller machine network. The bank also purchased a license for Dallas-based Shared Financial Systems, Inc.'s ON/2 software from Logica Financial Systems, Inc., Shared Financial's European distributor.

The Stratus system and software will route transactions received from the Trustee Savings Bank's ATMs across Ireland to the bank's NCR Corp. mainframe in Dublin for authorization. The Stratus system also will enable the bank to link its ATM network to the ATM nets of other European banks when the European Community forms a unified financial market next year.

This will enable Trustee Savings Bank's ATM cardholders to obtain cash from ATMs owned by other banks.

The bank also plans to use the Stratus system and software to offer transaction processing services to smaller banks that can not afford to buy their own hardware and software. ◘

IBM looking at pan-European VSAT network

Ron Condon
IDG News Service

LONDON — IBM is studying the possibility of establishing a pan-European very small aperture terminal satellite network to distribute software and software documentation throughout Europe.

IBM has commissioned Hyperion, a British information technology consultancy, to produce a feasibility study in anticipation of the pan-European relaxation of the rules governing satellite usage.

A spokesperson for IBM downplayed the move, saying the company had paid Hyperion "a very small amount" for the study. "We are looking at the general potential of the technology and what might be the best way of approaching it."

Chris Birch, Hyperion's marketing director, would only say that IBM had "several requirements" and that the study would take three or four months.

He added that the big attraction of a VSAT network in Europe, in addition to its low cost, is its flexibility and ability to operate across national boundaries. "Instead of dealing with umpteen PTTs, you deal with a single network, which is easier to control and gives much higher reliability," he said.

European countries that are relaxing restrictions on private VSAT networks include Germany and the U.K. ◘

German carrier to trim work force by 10,000

IDG News Service
European Bureau

PARIS — Deutsche Bundespost Telekom, the telecommunications arm of Germany's state-owned postal authority, recently said it plans to cut more than 10,000 employees from its 250,000 work force by 1997 in order to improve profitability.

The job reductions are expected to occur during a period when the carrier's revenue will double. Deutsche Bundespost Telekom reported revenue of DM38.3 billion ($22 billion U.S.) from network services in 1989. Final 1990 data will be reported later this year, according to the carrier.

The high cost of Germany's reunification is straining Deutsche Bundespost Telekom's finances. The carrier expects to show a profit of about DM3 billion ($1.7 billion) in 1990. But high investment in eastern Germany is expected to erode profits this year.

Deutsche Bundespost Telekom initially said that 1991 profits would total DM700 million ($403 million) after a transfer of about DM2 billion ($1.2 billion) to the carrier's loss-plagued postal and banking units. However, in February, Deutsche Bundespost Telekom said it did not expect to make a profit this year. ◘

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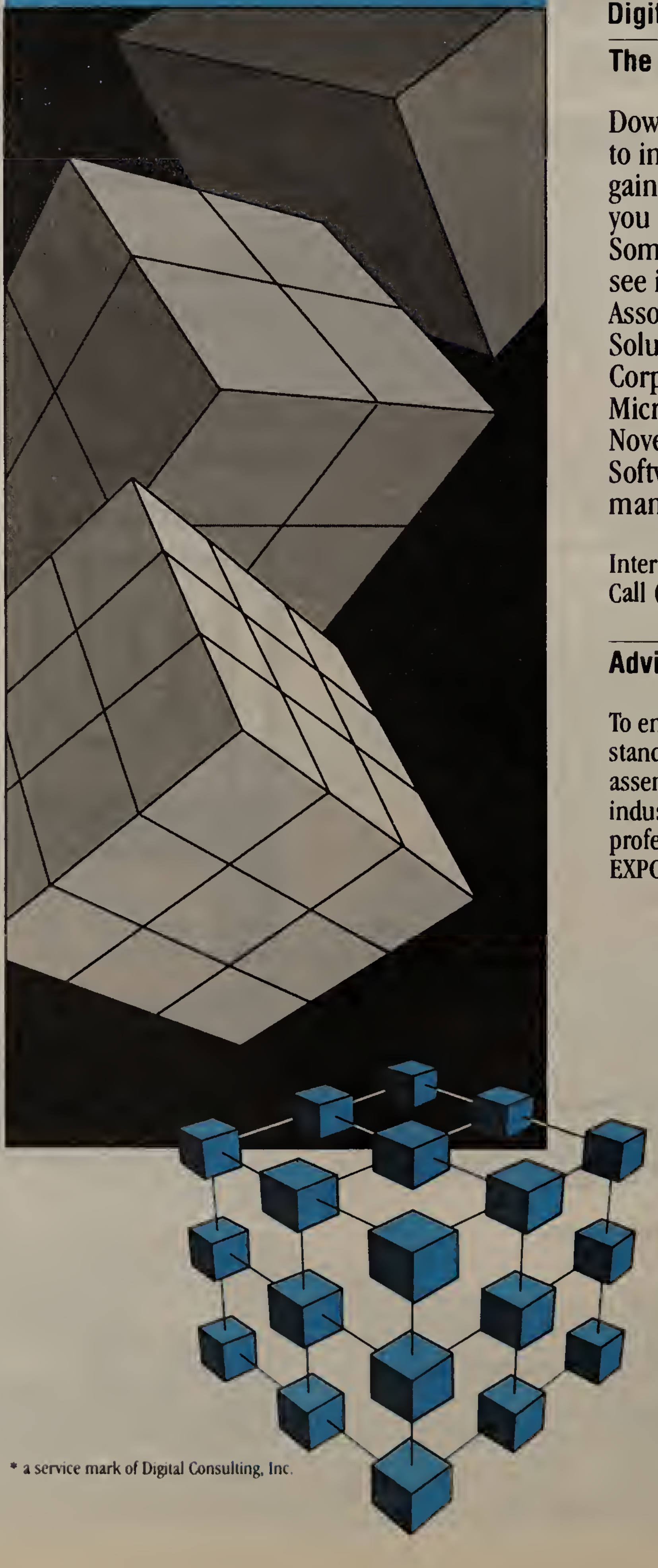

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THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

First Look

HP trims prices on 8-bit Ethernet adapter

Hewlett-Packard Co. recently said it has slashed the price of its **HP EtherTwist** adapter cards by as much as 27%. The six-pack price for the 8-bit HP EtherTwist has been cut from $2,250 to $1,650, reducing the single-card price by $100. Individual cards cost $445 each.

Hewlett-Packard Co., 19310 Pruneridge Ave., Cupertino, Calif. 95014; (800) 752-0900.

Latest EtherPeek version supports SNMP, MacIP

AG Group recently announced **EtherPeek 1.3,** the latest version of its Apple Computer, Inc. protocol analyzer that includes such features as support for the Simple Network Management Protocol (SNMP) and Macintosh Internet Protocol (MacIP).

According to the Walnut Creek, Calif.-based company, the new version includes decoders for SNMP and MacIP packets. By double clicking on a packet header in the main window display, administrators can see the contents of the packets broken out by protocol layers.

EtherPeek 1.3 is available now for $695.

The AG Group, 2540 Camino Diablo, Suite 202, Walnut Creek, Calif. 94596; (415) 937-7900.

X Window client software takes bow

The **Spartacus, Inc.** division of Fibronics International, Inc. has released X Window System client software for IBM and compatible mainframes. **Knet X Windows** allows mainframes running the MVS and VM operating systems to be servers in a multivendor X Window environment.

Knet X Windows supports the Open Systems Foundation's Motif graphical user interface. It ranges in price from $4,000 to $6,000 for VM systems and $6,500 to $8,500 for MVS systems.

Spartacus, Inc., 1 Lowell Research Center, 847 Rodgers St., Lowell, Mass. 01852; (617) 275-4220.

Dial-up mgr. launched by U.S. Robotics

By Jim Brown
Senior Editor

SKOKIE, Ill. — U.S. Robotics, Inc. recently unveiled a modem management system that will enable users to monitor and control central site dial-up modems.

The heart of the Total Control system is a 16-slot chassis that supports boards containing one or two modems and a rack controller that tracks the configuration for each board. As many as 32 Total Control Rack Chassis can be daisy-chained to enable a central site operator to monitor and control up to 1,024 modems.

The Rack Chassis controllers collect management data from modem boards and pass it via an RS-232 link to a DOS-based microcomputer running Total Control PC software. Operators can use the microcomputer to load configuration settings into rack controllers, which then download the settings to each modem.

> Auto Response enables users to store a set of routine commands on each controller.
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Operators can also use the microcomputer to configure Auto Response software on controllers. Auto Response enables users to store a set of routine operational commands on each controller. The controller then monitors every modem and automatically issues the commands needed to correct a problem when configuration settings exceed user-defined parameters.

For instance, Auto Response will take a failed central site modem out of operation and send an alert to the management microcomputer.

The chassis supports three modem boards: Total Control V.32bis, which operates at up to 14.4K bit/sec using the full-duplex CCITT V.32bis standard; Total Control HST, which uses a U.S. Robotics asymmetrical duplex method that enables the device to send data at 14.4K bit/sec and receive acknowledgements at 450 bit/sec; and Total Control dual standard modem boards, which support V.32bis and HST.

U.S. Robotics this year will release a Total Control 2400e/2 modem board, which includes two 2,400 bit/sec modems.

In addition to loading parameters into controller boards, the microcomputer software is used to store failure records in an ASCII file.

A report generation tool built into Total Control PC enables users to produce inventory, system status, modem utilization, alarm summary, configuration summary and event log reports. Users can also export the ASCII files into other microcomputer-based applications, such as a spreadsheet for customized analysis.

By year end, U.S. Robotics is planning to release an interface linking Total Control to IBM's bidirectional NetView/PC. The interface will pass data between the IBM host-based NetView and each chassis. The firm is also planning to introduce before 1992 an interface linking Total Control to workstations running the Simple Network Management Protocol.

The Total Control Rack Chassis costs $2,295 and includes a single power supply. An optional redundant power supply is $495. Users can upgrade U.S. Robotics Rackmount 32 chassis to Total Control Rack Chassis for $1,995.

The V.32bis and HST modem boards are priced at $1,295, while the dual-standard board costs $1,595. Users can upgrade Courier V.32bis, Courier HST or Courier dual-standard modem boards to Total Control modem boards for $225. The Total Control PC software costs $5,000.

U.S. Robotics can be reached at 8100 N. McCormick Blvd., Skokie, Ill. 60076, or call (800) 342-5877 or (708) 982-5010.

Cabletron board ties LocalTalk, Ethernet

Router/gateway product for company's intelligent wiring hub was developed with Cayman Systems.

By Caryn Gillooly
Senior Editor

ROCHESTER, N.H. — Cabletron Systems, Inc. and Cayman Systems, Inc. recently brought out the GatorMIM CS, a LocalTalk-to-Ethernet router/gateway module for Cabletron's Multi Media Access Center (MMAC) intelligent wiring hub.

As a router, the module will let customers with hubs configured to support LocalTalk and Ethernet networks exchange files between the environments. Acting as a gateway, the GatorMIM CS can translate between AppleTalk protocols and Transmission Control Protocol/Internet Protocol (TCP/IP) to allow file transfer between these environments.

The module also comes with an option to let LocalTalk users access files from Network File System servers.

According to Cayman, located in Cambridge, Mass., the GatorMIM CS module for the Cabletron wiring hub provides the same functionality as its existing GatorBox CS gateway and runs Cayman's application gateway software.

Because the GatorMIM CS resides in the same chassis as other types of Cabletron networking modules, LocalTalk users — or any user with access to the hub — will be able to take advantage of the capabilities supported by the other modules, such as Ethernet-to-Fiber Distributed Data Interface routing.

Network managers will also be able to manage and control Macintoshes on a LocalTalk net with the module's support of the Simple Network Management Protocol.

The release of the GatorMIM CS stems from a previously announced technology development agreement between Cayman and Cabletron, based here. And, according to Cabletron, the relationship will not stop there.

"This is just the first of a whole line of products we'll be codeveloping with Cayman," said Bill Clark, product support manager at Cabletron. Clark would not be more specific.

Cabletron is also codeveloping products with other vendors. The company recently added a terminal server module to its MMAC hub through an agreement with Xyplex, Inc. and is currently working with Cisco Systems, Inc. to integrate routing capabilities into the hub.

The GatorMIM CS is available now from both Cabletron and Cayman for $2,795.

For more information, contact Cabletron at 35 Industrial Way, Rochester, N.H. 03867, or call (603) 332-9400.

Low-cost high-end PS/2s may fill 486 server needs

By Eric Smalley
Senior Editor

WHITE PLAINS, N.Y. — As expected, IBM last week boosted its Personal System/2 microcomputer line with the introduction of two low-cost versions of its top-of-the-line models, which are often used as LAN servers, and price cuts for several of the low-end models.

The two PS/2s — the Model 90 XP 486 SX and Model 95 XP 486 SX — are based on the new 20-MHz, 32-bit Intel Corp. 80486SX microprocessor. Unlike 80386SX-based machines, the new boxes have 32-bit data paths. They differ from existing 80486-based PS/2s in that they lack of an integrated math coprocessor.

At an entry price just under $10,000, the PS/2 Model 95 XP 486 SX is well suited to be a file server, according to John Dunkle, president of Workgroup Technologies, Inc., a market research firm in Hampton, N.H.

More than 65% of local-area network servers are used as file servers and do not perform application processing. "This is the first time a 486 is affordable from a major vendor," Dunkle said.

The systems come with 4M bytes of memory and an adapter for the PS/2 Micro Channel Architecture I/O bus that allows Small Computer System Interface devices to be linked to the system. The desktop Model 90 XP 486 SX is configured with an 80M- or a 160M-byte hard disk drive and has three expansion slots. The desk-side Model 95 XP 486 SX is configured with a 160M- or 400M-byte hard disk drive and has six expansion slots.

The PS/2 Model 90 XP 486 SX is available now for $8,345 or $8,945, depending on the hard drive configuration. The PS/2 Model 95 XP 486 SX is scheduled to be available in July for $9,995 or $12,695, depending on the hard disk required.

IBM has reduced the prices of some PS/2 models, many of which are scheduled to be discontinued in July, to make way for new machines that will be unveiled this summer.

The price cuts include the PS/2 Model 50 Z-031, formerly $2,745, now $1,695; Model 65 SX-061, formerly $4,445, now $3,145; Model 70 386-E61, formerly $4,395, now $3,945; Model 90 XP 486-0J5, formerly $12,495, now $10,845; and Model 95 XP 486-0J9, formerly $14,145, now $12,545.

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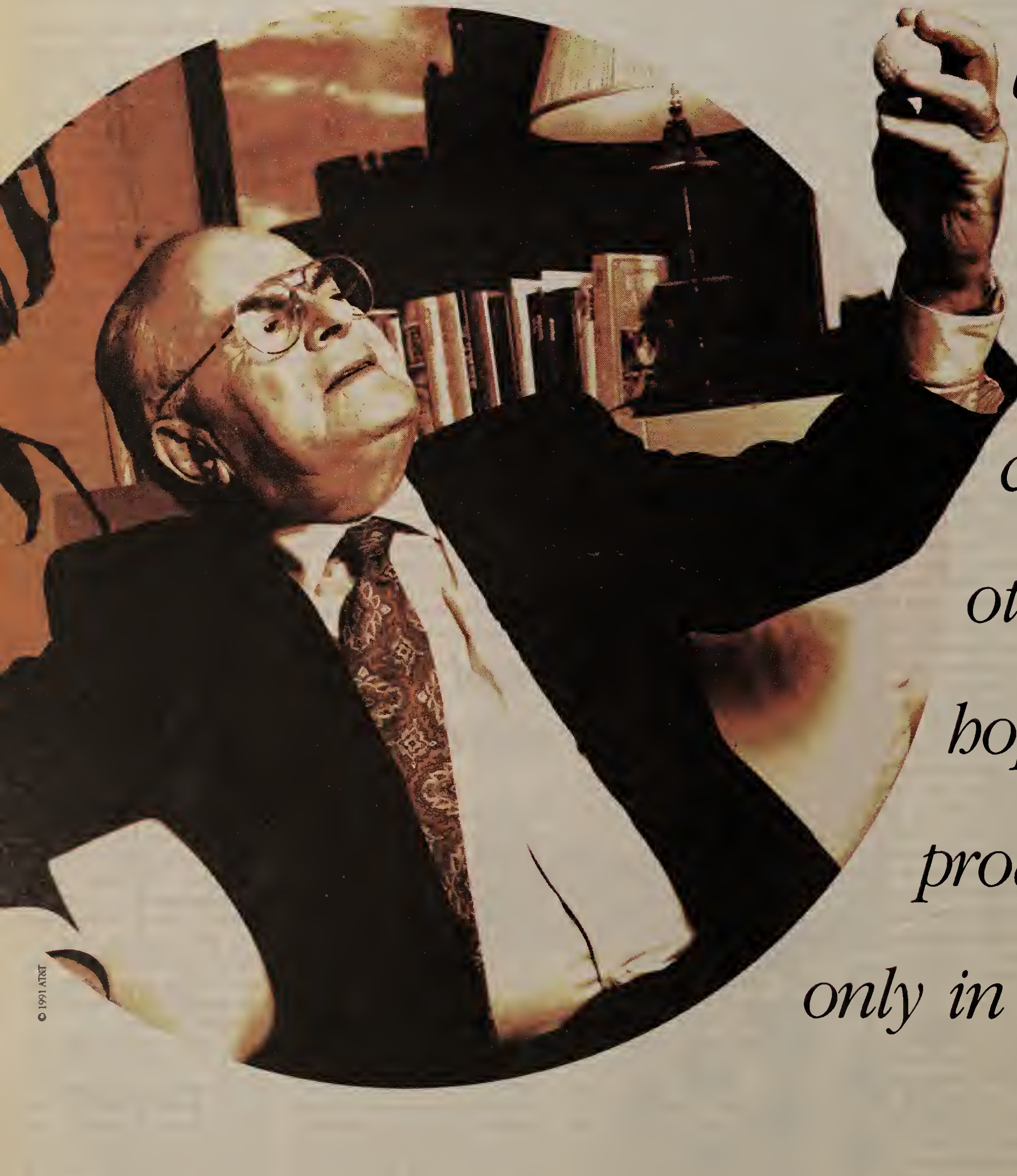

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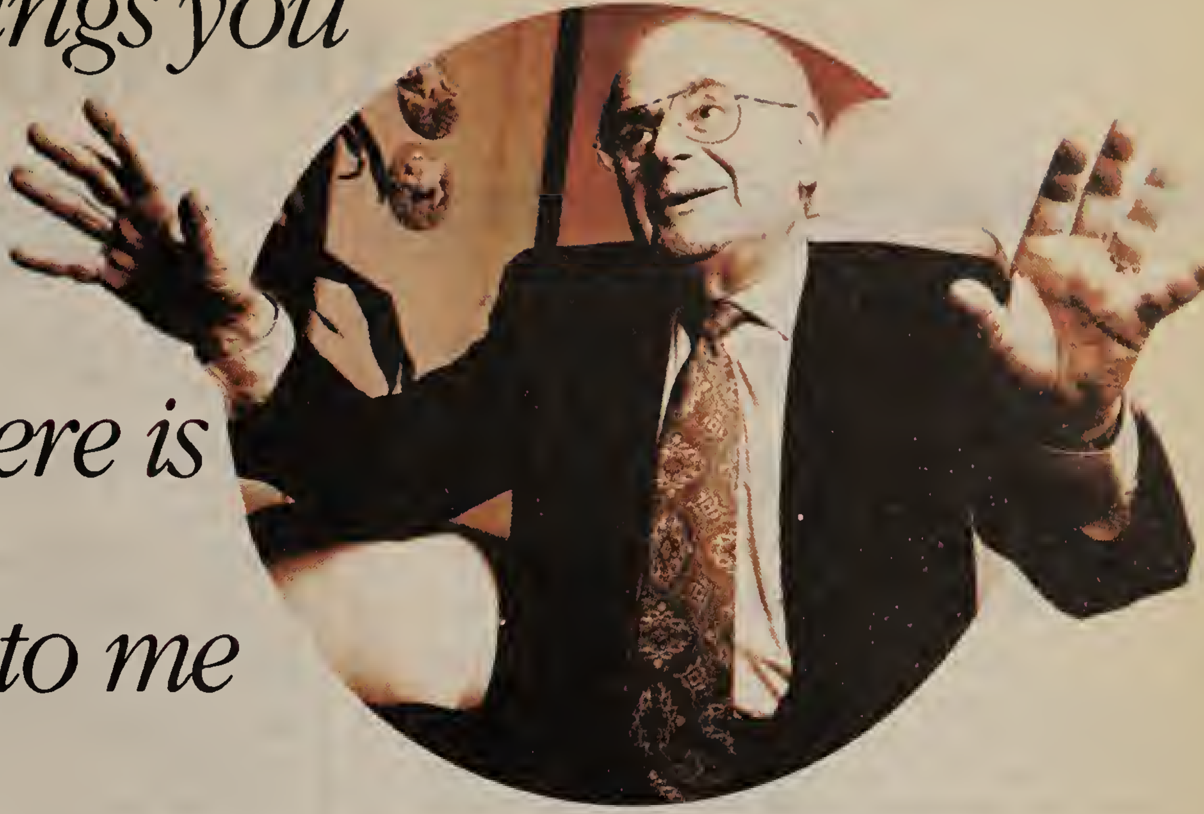

OPINIONS

PRIVACY ISSUES

BY BENJAMIN WRIGHT

Trapdoor clause latest shot in an eternal war

Our society harbors two blood enemies: privacy and law enforcement interests. Dispute between them erupts every time communications technology advances. For example, when the telephone was introduced, lawsuits were fought over whether the police could tap conversations.

The counterterrorism bill now before Congress contains a provision that constitutes the first shot in the latest battle of this eternal war. It seemingly requires the purveyors of communications equipment and services to be able to unscramble encrypted messages without user consent. That might mean developers will have to construct trapdoors — confidential passwords or similar unwanted features in encryption schemes ("Provision in bill would let the gov't decode messages," *NW,* April 22).

The bill is worded as an unacceptably vague political declaration rather than as a law. A properly crafted statute would be much more specific and would lay out the precise penalties for breaking the law.

This confusing bill should not, and likely will not, survive in its current form. It is, nevertheless, important.

> Privacy rights are always subject to controlled police surveillance.
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Neither privacy nor law enforcement interests are ever total winners under our law. The Fourth Amendment to the Constitution protects us only from *unreasonable* searches by the government, not all searches. Privacy rights are always subject to controlled police surveillance.

Encryption technology could unjustly tip the balance of power in favor of privacy. There are already stories about wily drug traffickers encrypting their telephone conversations. An active imagination can envision the day when all messages are scrambled, delivering a serious blow to law enforcement.

But this does not mean we should undermine encryption technology. Encryption permits law-abiding businesses to protect their trade secrets.

So can we find a compromise? Formulation of a fair law requiring the construction of trapdoors would be very challenging but not necessarily impossible. Congress could license encryption equipment and require trapdoors as a condition to obtaining a license. However, it would have to criminalize both the manufacture of unlicensed equipment and the use of it with the intent to conceal information.

The trapdoors themselves could be secured with cryptographic "locks." The keys to those locks could be collected and guarded by a new, trustworthy body — maybe a government agency, a series of independent foundations or a combination thereof. But users would need ironclad assurance from the body that the keys are secure.

Unfortunately, the establishment of a trusted body would cost money. An obvious source of funds would be a charge on purchases of approved encryption equipment. That could adversely affect our nascent encryption industry. Further, the construction of trapdoors might make encryption more cumbersome to use.

The measure now before Congress is woefully deficient as it stands. But it does open legitimate debate on how to balance the use of a technology that can serve both good and evil. ◻

Wright is the author of The Law of Electronic Commerce: EDI, Fax and E-mail, *a new book published by Little, Brown and Co., Boston.*

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EDITORIAL

Let's find out whether FTS 2000 was mismanaged

Congressional investigators should probe further to determine whether significant mismanagement has occurred in the administration of Uncle Sam's new net, the Federal Telecommunications System (FTS) 2000.

Committees of both congressional houses have held hearings looking into the management of FTS 2000. But more hearings are clearly necessary. So far, there have been more questions raised than answers provided.

Naturally, taxpayers will be concerned if there has been mismanagement. But federal attitudes toward FTS 2000 may have a broad impact on networking because the project is supposed to be a test bed for high-technology services. Also, negotiations for FTS 2000 may show how difficult it is to renegotiate pricing for private networks.

The basic question is whether the General Services Administration — which is responsible for running FTS 2000 and keeping costs in line — negotiated improperly with US Sprint Communications Co., as investigators charge, instead of insisting that the carrier repay certain alleged overcharges.

The hearings demonstrate that the GSA has been having considerable difficulty in its attempts to reduce FTS 2000 charges in negotiations with US Sprint and AT&T. Neither carrier has been willing to admit overcharges, and US Sprint allegedly threatened the GSA with legal proceedings or even pulling out of the network if the administration demanded that retribution be paid.

Why do these negotiating problems exist when price caps on services are clearly spelled out in the FTS 2000 contract? Perhaps a lack of negotiating supervision and not enough savvy on the part of the GSA's staff.

Clearly, US Sprint charges more than AT&T; that fact came out in the hearings. How much more? Sources quoted by *The New York Times* say US Sprint charges as much as 30% more.

There is a certain irony in this situation. In many networks and for most dialed calls, US Sprint charges less than AT&T. But for the services it provides for FTS 2000, it charges more. Therefore, investigators are right to ask whether Uncle Sam is being overcharged.

There's no question that FTS 2000 saves money for the government. The latest estimate is that it saves close to $200 million a year as compared with the network it replaced.

But could the GSA save even more? And should it more closely follow procedures designed to ensure that purchases are conducted fairly? Those questions have yet to be answered. ◻

OPINIONS

OSF'S DISTRIBUTED MGMT. ENVIRONMENT

BY JAMES HERMAN

OSF key to multivendor network, systems management

For some time now, it has been clear that network and systems management is going to be a make-or-break issue for users with multivendor, distributed systems.

The emergence of a large community of independent software vendors that write management software, which might be the outcome of a new Open Software Foundation (OSF) initiative, would be one of the most significant steps ever made toward solving that problem.

By defining a single set of application program interfaces (API) that both users and systems vendors widely endorse, OSF, in its Distributed Management Environment (DME) request for technology (RFT), has a good shot at defining the first vendor-neutral management software market that would be large enough to attract independent software vendors.

Independent software vendors are crucial to the eventual solution to the multivendor management problem plaguing users. Rarely have systems vendors such as Digital Equipment Corp., Hewlett-Packard Co. and Sun Microsystems, Inc. provided early, innovative solutions to any difficult software application need.

In addition, independent software vendors as well as network equipment vendors that need to produce management systems do not like having to choose between the existing APIs defined by the major systems vendors.

Currently, it's impossible to write management software that works on all systems because their APIs are completely different and their conceptual models don't match.

The OSF APIs that result from the DME will be the safe, vendor-neutral choice for everyone involved.

If OSF succeeds in defining an environment that catalyzes the formation of an independent software vendor community, it will speed up the development of the kind of improved management applications that users really need. Quite simply, the management applications that users need just don't exist at the moment, largely because there hasn't been a single, industry-wide market large enough to support their development. OSF is trying to fix that problem by defining the key standards and priming the pump with a few basic applications.

> The OSF APIs that result from the DME will be the safe choice for everyone.
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The most important part of the DME RFT is the request for a management framework. That would define the APIs that management software applications would use to invoke common management services and access common data bases of management information, interact with a human interface, and exchange management information with objects in local and remote systems.

Most previous efforts at standardization have concentrated on computer-to-computer protocol standardization. Instead, OSF's effort is concentrating on the definition of standardized APIs that create an environment for management application software — a multivendor management platform.

Defining a management platform will simplify the task of writing management software by injecting many of the basic functions into common service routines shared by all applications.

The key to the framework is the separation of management application software from common services, data bases and user interfaces. As a by-product, separately written management applications will be able to share common management data bases and user displays.

Thus, the DME is extremely important to users and to the communications industry as a whole. If it is good, the DME will likely become the basis for most management software later in this decade. The DME is also important to the acceptance of OSF's other technologies, including OSF/1, Motif and, particularly, the Distributed Computing Environment (DCE).

The next generation of DCE applications must be developed with distributed management in mind. OSF would be reckless if it didn't define an approach to managing the distributed computing technology it is bringing to the market.

Whenever a new technology gets ahead of the technology designed to manage it, there's trouble ahead. The DME will define standard interfaces for managing the components of OSF/1, Motif and the DCE, as well as user applications developed in these OSF environments.

Therefore, the major effect of the DME will be the creation of a cadre of independent software vendors writing management software to cure the problems of distributed systems management.

Already, start-ups are forming to exploit that market. Large user companies are beginning to specify the OSF DME as a key standard in the long-term architecture for their management systems. Users should watch the DME closely. It will be in their best interests to require compliance with the DME in future network and systems management purchases. ◻

Herman is a principal with Northeast Consulting Resources, Inc., a Boston-based consulting firm focused on strategic management and information technologies.

"A GOOD SYMBOL IS THE BEST ARGUMENT," according to Ralph Waldo Emerson. Got any good symbols around which to argue in an opinion column? If so, let us know.

Columns should be 600 words in length and submitted on disk, via modem or through MCI Mail at 390-4868.

If you'd like to write a column, call Alison Conliffe, associate features editor, at (508) 820-7416 or fax your idea to us at (508) 820-3467.

TELETOONS

BY FRANK AND TROISE

Don't say I didn't warn you that $249.95 was an awfully cheap price for a video-conferencing system.
Paul Frank

LETTERS

Not the only option

Companies seem to be missing the point on the importance and functionality of local-area networks ("Users wary of moving applications to LANs," *NW*, April 1). Applications originally developed for a centralized computer philosophy and strategy are often not structured for use on LANs.

This downsizing or retrofitting causes many companies to spend money unnecessarily. It is an attempt at forcing a "square peg into a round hole."

An application should be investigated to see if it can be logically divided into pieces. In this way part of an application, such as discrete entities of a data base or mail/messaging application, can be easily distributed among LANs. Hooks, such as SQL for data bases or X.400 for messaging services, can be used to access the greater whole.

LANs should be used to keep local traffic local. Why pay for a multimillion-dollar, centralized mainframe to act as the post office, as one mid-Atlantic chemical company does? Why store copies of local documents on expensive mainframe direct access storage devices, called "disk farms," when LANs can be used? Why incur huge corporate expenses and bill them back (an expense in itself) to the departments when the costs can be directly incurred by the department that needs the networking service?

Users need to understand that downsizing critical applications is not the only option available.

C.S. Thorn
Communications consultant
Henkels & McCoy, Inc.
Blue Bell, Pa.

Network World *welcomes letters from its readers.*

Letters should be typed and double-spaced. Mail them to Editor, Network World, *161 Worcester Road, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

DATACOM

BUYER'S GUIDE

X.25 PACKET SWITCHES

The new X.25 switches: faster, more flexible

CONTINUED FROM PAGE 1

switches — those that receive and forward data in X.25 packets — focuses on some of the new frame relay capabilities of packet switches.

Mier, a Network World *contributing editor, is president and founder of Mier Communications, Inc., a Princeton Junction, N.J.-based computer networking and communications consultancy.*

But potential buyers should note that even without frame relay, X.25 switches are supporting faster trunk data rates and faster aggregate data rates.

Only a few years ago, the fastest circuit a packet switch could fill was a 56K bit/sec digital data link. Today, quite a few switches can handle T-1 circuits and European T-1 circuits.

The aggregate throughput capabilities of packet switches have also expanded.

Until relatively recently, packet switches could handle only tens of packet/sec. Today, even the smallest packet switches can receive, process and forward 100 packet/sec. Large nodal packet-switching systems can process anywhere from 1,000 to 10K packet/sec, and a few can process even more.

Furthermore, changes in the X.25 standard encourage higher data throughputs. The maximum allowed size of X.25 packets has grown with succeeding versions of the standard. And the latest version, published in 1988, permits packets as large as 4.096K bytes, a giant leap upward from the 1984 version's 1,024-byte maximum.

Support of the 1988 X.25 version, therefore, may be important to users seeking maximum throughput for high-volume data transfers. Unfortunately, as the Buyer's Guide shows, only two companies — Dowty Communications, Inc. and Netrix Corp. — currently feature full 1988 X.25 support. But other vendors are working on it and are expected to follow suit soon.

Packet-switching payoff

Today, more wide-area data traffic in the U.S. is carried over packet networks than ever before — somewhere between 10% and 20% of all long-haul data traffic, according to most industry analysts.

This figure is extremely low compared with X.25 usage in Europe, where approximately 80% of wide-area network data traffic is sent through public and private packet networks. There's an economic reason for the difference: In Europe, leased networking facilities can cost 10 times more than they do in the U.S.

This popularity of packet switching where bandwidth is expensive underscores one of packet switching's major advantages: It permits transmission facilities to be used more efficiently because any number of different logical connections (called virtual circuits) can share the same physical network path.

Even so, packet switching may not be the most appropriate technology for every organization's backbone data network. While the price of equipment is continuing to drop, packet switching is likely to be a more expensive alternative than, say, a network based solely on modems and dial-up or leased-line connections.

CHART • GUIDE

A Buyer's Guide chart comparing X.25 packet switches from various vendors appears on pages 38, 50, 51, 52, 54 and 56.

To truly exploit packet switching, users need the appropriate network topology. In general, the scenarios that most favor packet switching are those in which:

- Many geographically dispersed sites must be connected, especially where each site must be able to communicate, to some degree, with every other site.
- There is a mix of traffic types (such as bursty, interactive, large file transfers), host types and protocol types.
- Standards compliance is paramount, either by virtue of organizational mandate — as with the Government Open Systems Interconnection Profile — or for international data network compatibility.
- Data integrity over the WAN is crucial. However, the robust error checking and correction features of X.25-based packet

(continued on page 39)

Hybrid X.25/frame relay switches, which can considerably increase user data throughput, are starting to appear.

X.25 packet switches (continued on page 50)

Company	Product	Physical interfaces	Number of ports, data rates supported	Switch configuration	Protocols supported	Private networking	Virtual circuit capacity	Throughput (packet/sec)	Frame relay support	Management	Price
BBN Communications Corp., Cambridge, Mass. (617) 873-4000	T/300 Packet Switching Node	RS-232, X.21, V.35, T-1/E-1 (under development)	Network trunks: up to 10 at 256K bit/sec; terminal ports: up to 77 at 19.2K bit/sec	Proprietary processors, multislot chassis, redundancy option, rack-mountable or stand-alone	Network: X.25 (1980, 1984), X.75 (1984), fast select; terminal: asynchronous	Dynamic fastest path and alternate routing; real-time traffic loading; call accounting; numerous addressing options; automatic monitoring of trunk line quality; local switching of X.25 DTE; call-by-call security options for priority levels	14,000	300 to 4,000 (depends on system and configuration)	Frame relay DTE under development	Vendor's Unix-based Network Operation Center; call accounting, automatic problem identification, loopback, traffic generation, remote node analysis; management reports on capacity, throughput, outages	$19,000 to $150,000, depending on system and configuration
	C/300 Packet Switching Node	RS-232 (V.24, V.28), V.35, RS-449, Mil-Standard 188-114	Network trunks: up to 32 at 64K bit/sec; terminal ports: up to 64 at 19.2K bit/sec	Proprietary gate-array technology, multislot chassis	Same as above	Same as above	1,200	Same as above	Same as above	Same as above	Same as above
	C/33 Packet Switching Node	RS-232, V.35, X.21, RS-449	Network trunks: up to 16 at 64K bit/sec; terminal ports: up to 24 at 19.2K bit/sec	Same as for above, board compatible	Same as above	Same as above	1,200	Same as above	Same as above	Same as above	Same as above
	C/3 Packet Switching Node	RS-232, V.35, X.21	Network trunks: up to 2 at 64K bit/sec; terminal ports: up to 10 at 19.2K bit/sec	Bit-slice processor, rack-mountable or desktop	Same as above	Same as above	512	Same as above	Same as above	Same as above	Same as above
BT North America, Inc., San Jose, Calif. (408) 922-0250	CXL	DB-9, RJ-45, RS-232 (V.24), V.35	Network trunks: up to 2 at 162.5K bit/sec; terminal ports: up to 32 at 4.8K bit/sec and up to 16 at 19.2K bit/sec	32-bit CPU, 8-slot single chassis, stand-alone cabinet	Network: X.25; terminal: asynchronous; BSC, 3270 SNA, 2780/3780 HASP, SDLC, UTS 4000, Burroughs	Automatic alternate routing	4,095 per application	625	None	On-line network monitoring and diagnostics	$26,500 to $60,000
	DCXL	DB-9, RJ-45, RS-232 (V.24), V.35	Same as above	Same as above, except with redundant CPU and memory	Same as above	Same as above	Same as above	1,250	None	Same as above	$44,600 to $61,000
	PXL	RS-232 (V.24), RJ-45, V.35	Network trunks: up to 4 at 64K bit/sec; terminal ports: up to 32 at 4.8K bit/sec and up to 16 at 9.6K bit/sec	32-bit CPU, 10-slot chassis, stand-alone	Same as above	Same as above	Same as above	625	None	Same as above	$7,500 to $12,500
	Turbo Engine	RS-232 (V.24), V.35, RS-449, RS-422, T-1/E-1 (mid-1992)	Network trunks: up to 384K bit/sec; terminal ports: up to 256 ports total in 4-chassis system	Motorola 68020 CPU, up to 4 chassis (20 card slots per chassis), desktop or stackable chassis	Network: X.25, X.75; terminal: asynchronous, SNA, SDLC, HDLC	Supervisory node for network, communicates with other nodes through in-band control channels	Same as above	2,000 (based on 1-chassis system)	Under development	Vendor's Unix-based network management station; data base, real-time network event information; detailed reports; CMIP support planned by mid-1992	$30,190 (1 chassis) to $81,390 (4 chassis)
Codex Corp., Mansfield, Mass. (508) 261-4000	Codex 6505	RS-232 (V.24), X.21, V.35, RS-530	Network trunks: 1 or 2 at up to 80K bit/sec; terminal ports: up to 23 at 19.2K bit/sec	Motorola 68000 CPU, 1- or 8-slot chassis (desktop) or 18 slots (rack-mountable)	Network: X.25, X.25 broadcast, QLLC; terminal: 3270 SNA/SDLC, 3270 BSC, 2780/3780 BSC, Honeywell VIP7700/7800, Burroughs Poll/Select, asynchronous, X.121, Hewlett-Packard Enq/Ack	Load balancing, alternate routing	Up to 2,500	50	Yes, physically separate from X.25 ports and traffic	Vendor's management system for central-site control of all vendor's X.25 nodes and other equipment	$1,750 to $5,750 hardware; $400 to $2,500 per software option
	Codex 6507	RS-232 (V.24), X.21, V.35, RS-530	Same as above	Same as above	Same as above	Load balancing, alternate routing	Same as above	150 to 300	Same as above	Same as above	$2,100 to $12,200 hardware; $400 to $2,500 per software option
	Codex 6525	RS-232 (V.24), X.21, V.35, RS-530	Network trunks: up to 80K bit/sec; terminal ports: up to 48	Same as above	Same as above	Load balancing, alternate routing, data session integrity, link backup	Same as above	250 to 950	Same as above	Same as above	$4,500 to $30,000 hardware; $400 to $2,500 per software option

ALC = Airline Link Control protocol for reservation-system terminal communications
CMIP = Common Management Information Protocol
DDCMP = Digital Data Communications Message Protocol
DSP = Display System Protocol; de facto standard for transport of BSC terminal traffic within an x.25 backbone
DTE = Data terminal equipment
LAP B = Link Access Procedure B
LAT = Local Area Transport
QLLC = Qualified Logical Link Control
SPARC = Scalable processor architecture
UTS = Univac Terminal System

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(continued from page 37)

switching are sacrificed to some degree for the increased speed and throughput of frame relay.

- Local-area networks are interconnected via WANs. For this task, packet switching may even offer advantages over point-to-point links.

Bottlenecks

In addition to being nodal packet switches, many of the products listed in the chart starting on page 38 support optional software modules for protocol conversion of various types of data traffic to and from the X.25 packet format. Many also support encapsulation of that traffic for transmission over the packet network.

The most commonly supported protocol adaptation feature is an asynchronous packet assembler/disassembler, which accepts and converts the traffic of virtually any asynchronous ASCII data device.

Other protocols commonly supported include: IBM 3270 synchronous terminals via both Systems Network Architecture/Synchronous Data Link Control and the older Binary Synchronous Communications protocol; IBM 2780/3780 batch terminals via BSC; and other major vendors' unique terminal protocols, such as Burroughs Corp.'s Poll Select and Hewlett-Packard Co.'s Enquiry/Acknowledge protocols.

Users considering packet switching should keep in mind that terminal protocol conversion, referred to as padding, exacts a heavy price from any packet switch's throughput. This is due to the considerable additional processing load that protocol conversion requires.

For example, Robert Burrows, senior director of marketing for data networking at Codex Corp., estimates that asynchronous padding requires a switch with five times the processing power needed for pure X.25 packet switching.

Therefore, a packet switch burdened with protocol conversion processing might well have its packet processing throughput cut by as much as 80%. The impact is not quite as bad with BSC padding; it might reduce packet throughput by as much as 75%. With more efficient protocols such as SNA/SDLC, the load imposed on the packet switch for padding is not likely to reduce the switch's packet processing capability by more than 65% (as compared with a packet switch performing only X.25 processing).

Experts say the most efficient packet network design approach is to have nodal packet switches within the network that are dedicated to packet switching. Padding and other protocol conversion processing should be moved out to the periphery of the packet network.

"Keeping [protocol conversion] at the edge of the network keeps the whole network more efficient and allows you to get by with much smaller [packet] switches," Burrows says.

According to experts, protocol conversion and padding is such a processing burden that it can completely negate the improved throughput performance that frame relay provides.

On an end-to-end basis, the amount of round-trip delay — the response time that a workstation operator experiences — is attributable to many factors. The time it takes the packet to transit the network is typically responsible for only a small part of the delay — about 5 msec to 10 msec per intermediate packet-switching node.

However, where protocol conversion is required, such as at a LAN gateway, the amount of delay introduced can be considerable. It can be so much of the total delay, in fact, that it may no longer matter whether frame relay is used to expedite data through the packet network.

"If you're padding, I don't think you'll see any difference on an end-to-end basis whether you're doing X.25 or frame relay on the [packet] network," Burrows says.

To truly maximize throughput over a packet network and keep user response times low, end-node devices should communicate directly via X.25 and, ultimately, via a frame relay interface.

Most computer vendors offer software and adapters for direct X.25 communications, including for most workstations. As Open Systems Interconnection proliferates, direct interfaces for X.25 are also likely to become more ubiquitous.

Nevertheless, proprietary protocols are entrenched, which means that protocol-conversion bottlenecks are likely to be around for the foreseeable future.

Packet management

Where network management is concerned, packet switches are in a different realm from other network equipment: They rarely have links to IBM's NetView or other popular management environments.

This is because packet switching is very different from other WAN transmission approaches, such as multiplexed dedicated circuits. Hence, packet networks have traditionally been managed solely by the proprietary management systems offered by the packet-switch vendors.

All the packet-switch vendors listed in the chart offer their own proprietary management systems — typically Unix-based workstations — for handling nets containing their packet switches.

However, a few vendors also offer links to other vendors' network management systems.

For example, Hughes Network Systems, Inc. provides links from its management system to IBM or DEC network management systems.

There are probably cases where this du-

(continued on page 40)

Some vendors think standards are all you need to build an open network.

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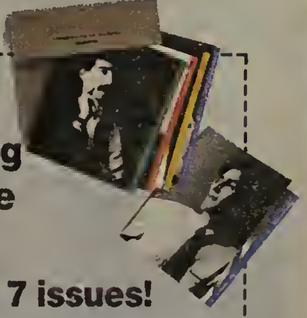

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plication of packet network management might be useful, but in general, it seems redundant.

At least one X.25 vendor, BT North America, Inc., is planning OSI-based network management of its packet switches. But that company may be overly optimistic in expecting to deliver that by mid-1992.

The OSI management specifications are still being fine-tuned, and conformance and interoperability testing of prototype OSI-based management implementations has yet to get under way.

Then there's the Simple Network Management Protocol (SNMP). So far, only Telefile, Inc. has committed to delivering SNMP support for its packet switches.

Initially, this support, which is expected by year end, is likely to be based on Telefile's own private Management Information Base objects.

This is because an SNMP standard establishing specific objects for managing packet-switching networks does not yet exist. However, an early document that addresses the subject of X.25 network management was introduced late last month within the Internet Engineering Task Force, a committee of the body that defines SNMP management.

Frame relay

Frame relay, a form of high-speed packet transmission, is so named because data envelopes are viewed by intermediate network nodes only at the OSI data-link layer (where such units are called "frames"), rather than at the network layer (where they are called "packets").

By contrast, X.25 switching requires intermediate nodes to check packets at the network layer, resulting in considerable delay.

The concept behind frame relay is to boost data throughput by decreasing redundant processing on the part of the network.

In frame relay, communicating end nodes are primarily responsible for ensuring that data is sent and received correctly; intermediate nodes are relieved of that responsibility.

Several manufacturers already offer frame relay support in their packet switches, notably Codex, Hughes Network Systems, Netrix, Plantronics Futurecomms, Inc., Telefile and US Sprint Communications Co.

Other vendors, including BBN Communications Corp., BT North America, Dynatech Communications, Inc., NEC America, Inc., Northern Telecom, Inc. and OST, Inc., are planning to add frame relay capability within the next year or so.

The Frame Relay Forum

According to Burrows, the frame relay specification is still being worked on within the Frame Relay Forum, a consortium of vendors dedicated to deploying frame relay and ensuring that different vendors' product implementations are compatible.

"The forum is working on billing and other control mechanisms," Burrows says. However, "the basic interface that allows you to ship data is in place and in products. You can establish frame relay networks today."

The vendors listed in the chart that have implemented frame relay all indicated that interoperability testing among their products is now under way. Some specific vendor-to-vendor compatibility testing has already been successfully completed, but most vendors agree that testing will be going on into next year.

How much faster?

There is considerable difference of opinion among vendors regarding the increase in throughput that frame relay will provide as compared with traditional packet switching.

"There will be [an improvement] factor of three in a typical network," Burrows says. If there are a lot of hops where intermediate nodes add cumulatively to the delay of each X.25-type packet, you could see an improvement factor of ten with frame relay, he adds.

According to BT North America, "The frame relay throughput is estimated to be 300% to 400% greater than the X.25 throughput."

"Frame relay throughput is approximately 10 times that of X.25 [packet] throughput," according to Netrix, which supports frame relay on its #1-ISS switch product line.

US Sprint supports frame relay on its latest packet switch, the TP4900. And the reported difference in data throughput is dramatic. While the TP4900 is capable of processing up to 10K packet/sec of traditional X.25-based packets, it can handle 70K frame/sec via frame relay, according to US Sprint documents.

This would appear to be a sevenfold increase in switch throughput. But the increase in user data throughput may be even greater. While X.25-based packets are limited in size to no more than 4.096K bytes in the 1988 version of X.25, frame relay frames can be twice as large — up to 8.189K bytes.

However, to accurately assess how much frame relay improves throughput over a packet network, it is necessary to view the data flow on an end-to-end basis.

Frame relay certainly expedites data's speedy passage through the packet network, but what happens before and after the data enters and leaves the network can make a big difference.

Since frame relay doesn't ensure data integrity, "you'll still see X.25 being used in an end-to-end fashion," Burrows says. "Data will be sent through the [packet] network using frame relay, however."

Despite this caveat, there are likely to be advantages to frame relay over X.25. And as frame relay's standards are completed and intervendor interoperability is addressed and demonstrated, its promise of throughput improvement is likely to be realized by users.

Still, with frame relay — as with X.25 — each network's specific design considerations will affect both the data rates and the throughput that are actually achieved.

Bytex unveils new switch

continued from page 15

data destined for a downed circuit to a backup circuit. Users can also switch traffic received on one port to a test port, which supports a variety of test tools such as protocol analyzers and bit error rate testers.

In addition to unveiling the Unity 50-LE, Bytex last week unwrapped an Event Manager option for its Microsoft Corp. Windows-based Unity Management System software. The Event Manager will consolidate alarms received from remote switches and present them on a single window.

An operator can establish ASCII terminal emulation sessions on the microcomputer running Unity Management System and dial into a remote switch's diagnostic port. The operator will then be able to run tests or switch in backup circuits for failed circuits.

Previously, each switch routed alarms to a locally attached printer or via modem to a central site printer. This forced central site personnel to rely on staff at the remote site to respond to the alarm or to alert them. Transmitting alarms to a central site printer forced operators to manually review alarm logs in order to detect problems.

The Unity 50-LE ranges in price from $50,000 to $100,000 and is available now. The Unity Management System with Event Manager option is priced from $12,000 to $18,000; it is expected to be available in June. Existing Unity Management System users can purchase the Event Manager option for $2,900.

N.Y. carriers offer ISDN BRI

continued from page 13

While Teleport will initially work with AT&T, it plans to add other long-haul carriers as customer demand warrants it.

Bill Baldwin, general manager of TC Systems, said there is "a growing and unmet demand for ISDN services in New York City — not for island ISDN, but for long-haul connectivity and especially international ISDN services."

Teleport will work with Citibank during the next month or so to get the financial firm's ISDN links into operation, he said.

David Isherwood, a vice-president at Citibank's Global Systems Division, said dial-up personal computer-to-personal computer conferences using ISDN will enhance communications and improve the information flow between Citibank sites.

Citibank will use the ISDN service to communicate among its offices in New York and Brussels, Belgium, Dusseldorf, Germany, London and Singapore.

Although the ISDN service will not feature a signaling capability across the entire link, Isherwood said the offering will prove useful as long as "it looks like ISDN. We don't care what's in the middle."

Baldwin said TC Systems plans to announce detailed pricing and begin general availability of its ISDN service this summer.

The carrier also plans to provide starter packages that combine about six ISDN BRI lines with 50 auxiliary TC Systems Centrex lines to let users get a feel for using ISDN and developing applications, Baldwin said.

TC Systems has no immediate plans to offer ISDN Primary Rate Interface (PRI) service due to a lack of demand, he added.

New York Telephone, on the other hand, plans to file a tariff for ISDN PRI by year end, according to Don Lane, staff director for ISDN BRI services at Telesector Resources Group, Inc., a centralized product development and materials management company owned by New York Telephone and New England Telephone and Telegraph Co.

Both TC Systems and New York Telephone are taking part in a New York City ISDN trial ordered by the state Public Service Commission to ensure interoperability of their ISDN offerings with those of other carriers ("First phase of N.Y. ISDN trial completed with ease," *NW*, April 15).

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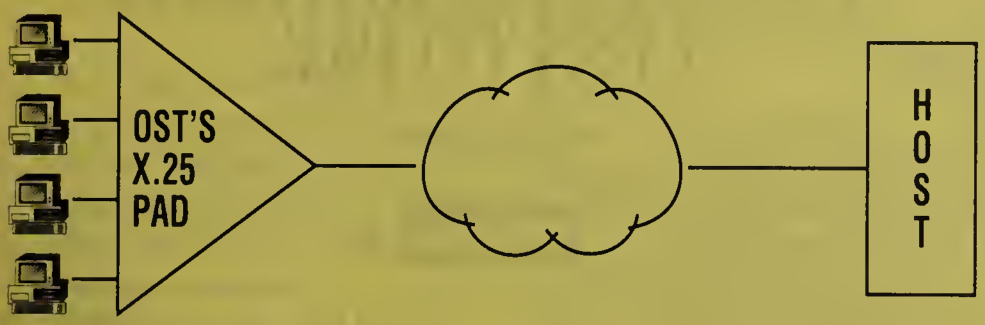

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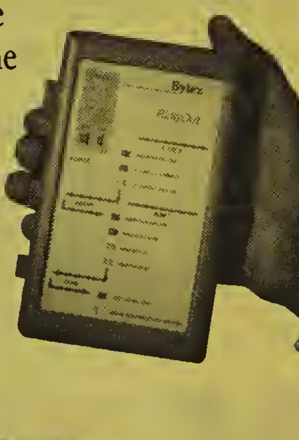

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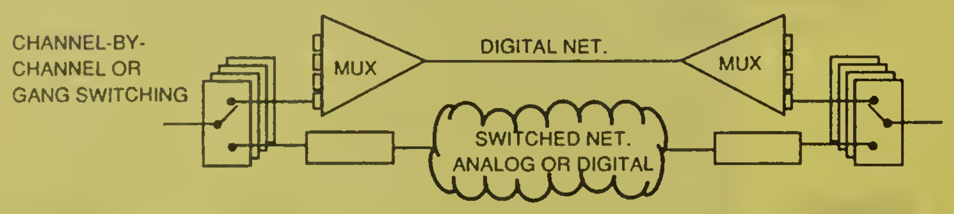
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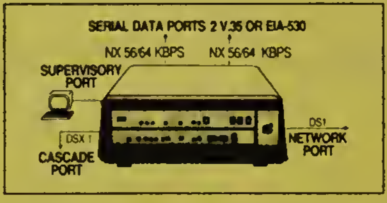

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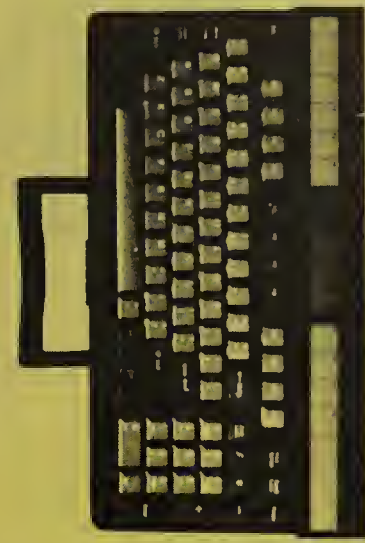

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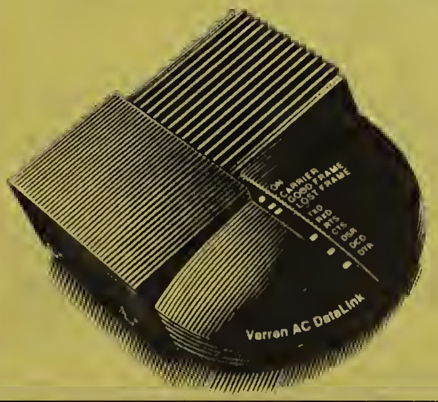

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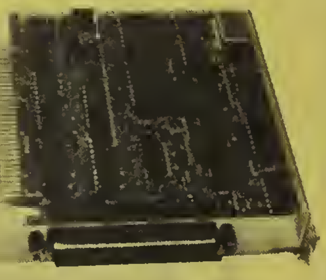

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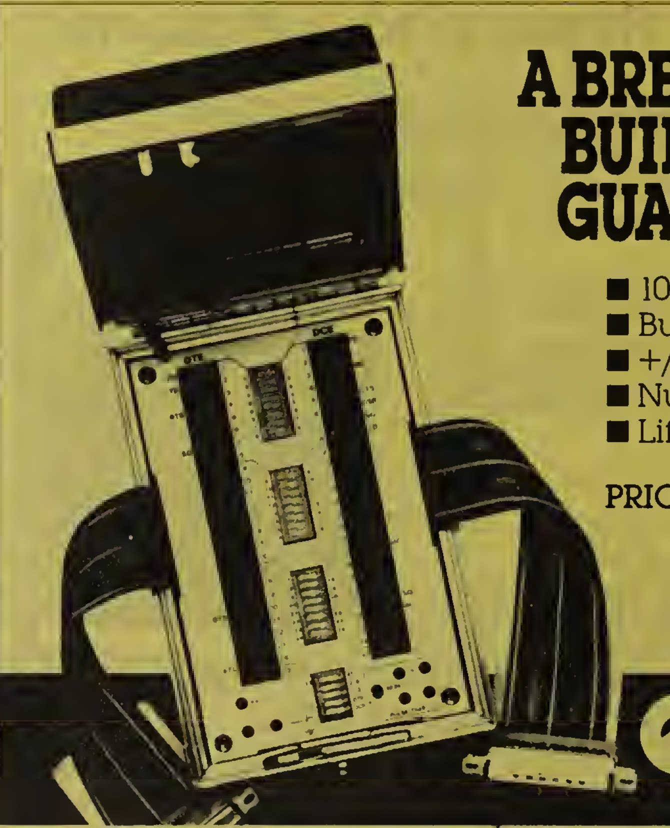

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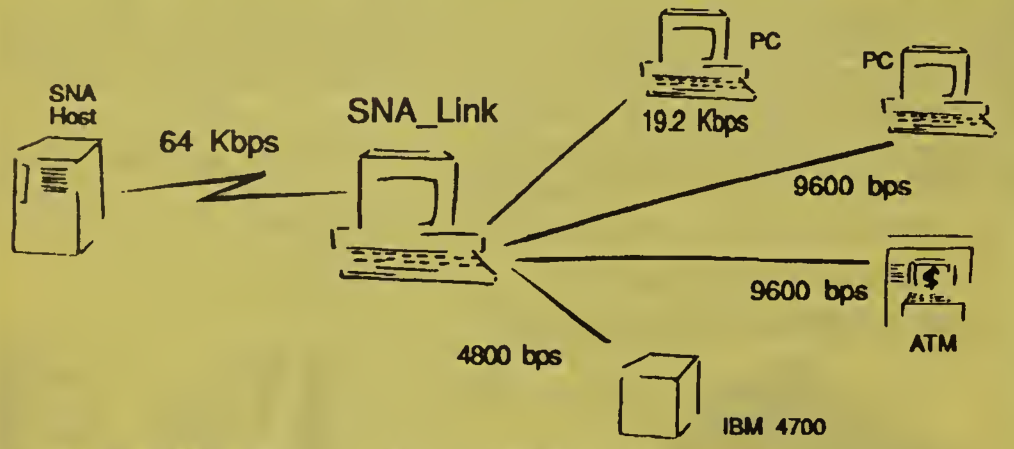

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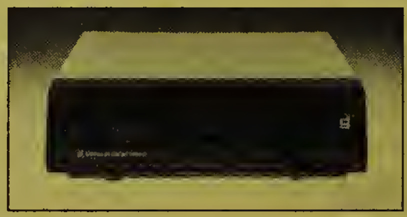

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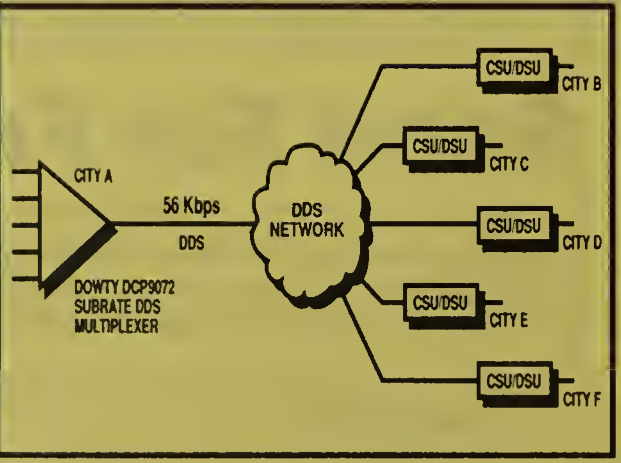

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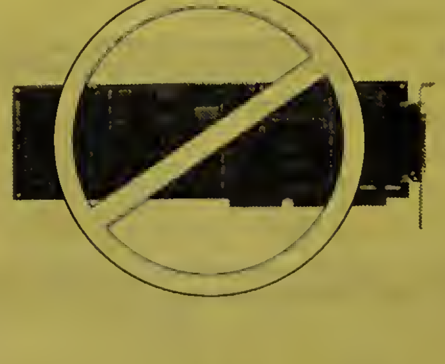

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Line Listing Rates (prices are net for 26-week period)	
Company listing	$500.
2-9 additional listings	$450. per listing
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Space and copy closing for next updated issue is April 25. Listing begins in May 20 issue and runs through the November 11, 1991 issue.

For more information or the list of headings, call Eleni Brisbois, Resource Directory/Project Manager at 1-800-622-1108 or 508-875-6400.

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TITLE ....

COMPANY NAME ....

DIVISION/DEPARTMENT ....

STREET ADDRESS ....

CITY .... STATE .... ZIP ....

C. Please Answer ALL Questions, Sign & Date the Form.

1 Industry: (check one only)

01. ☐ Manufacturers (other than computer/communications)
02. ☐ Finance/Banking
03. ☐ Insurance
04. ☐ Real Estate
05. ☐ Healthcare Services
06. ☐ Legal
07. ☐ Hospitality
08. ☐ Retail/Wholesale Trade
09. ☐ Transportation
10. ☐ Utilities
11. ☐ Education
12. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
13. ☐ Government State/Local
14. ☐ Government Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (independent)
18. ☐ Carriers
19. ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/Systems House
22. ☐ Distributor, Computer Related
23. ☐ Distributor, Communications Related
24. ☐ Other ____________

2 Job function: (check one only)

1. ☐ Networking Management (Responsible for both voice & data)
2. ☐ MIS Management (VP, Dir., Department Head)
3. ☐ Corporate Management (Chairman, President, Owner, General Manager, CEO, CIO, VP)
4. ☐ Data Communications Management (Responsible for data only)
5. ☐ Telecommunications Management (Responsible for voice only)
6. ☐ Financial Management
7. ☐ Engineering Management
8. ☐ Consultant (Independent)
9. ☐ Other ____________

3 What is the scope of your involvement in purchase decisions for Network/ Communications products + services? (check one only)

1. ☐ Enterprise Wide (Organization/Subsidiary/Division)
2. ☐ Multi Enterprise (Consultants)
3. ☐ Department Wide

4 What is the total number of sites for which you have purchase influence?

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1

5 Your primary responsibility: (check one only)

1. ☐ Both Data + Voice
2. ☐ Data Networking Only
3. ☐ Voice Networking Only
4. ☐ None

6 Which transmission media do you use in your network: (check all that apply)

Public:
01. ☐ Switched-Based (DDD, Wats, Megacom, etc.)
02. ☐ Leased Line (not including T-1)
03. ☐ T-1
04. ☐ Fractional T-1
05. ☐ T-3/SONET
06. ☐ Broadband
07. ☐ ISDN

Private:
08. ☐ Satellite
09. ☐ Microwave
10. ☐ Fiber Optic

7 Is your network: (check all that apply)

LOCAL AREA NETWORK
1. ☐ Local (within building)
2. ☐ Local (in a campus environment)

WIDE AREA NETWORKS
3. ☐ International
4. ☐ National
5. ☐ Regional (several states)
6. ☐ Metropolitan

8 What is your network architecture? (check all that apply)

1. ☐ SNA
2. ☐ DECNET
3. ☐ OSI
4. ☐ GOSIP
5. ☐ MAP/TOP
6. ☐ TCP/IP
7. ☐ DCA (UNISYS)
8. ☐ OTHER ____________

9 What Is your LAN Operating System? (check all that apply)

01. ☐ 3COM (3+, 3+open)
02. ☐ LOCAL TALK (APPLETALK)
03. ☐ BANYAN (VINES)
04. ☐ DCA (IRMALAN)
05. ☐ IBM (LAN Server)
06. ☐ IBM (PC LAN PROGRAM)
07. ☐ MICROSOFT (LAN MANAGER)
08. ☐ UNGERMAN BASS (NET/1)
09. ☐ NOVELL (NETWARE)
10. ☐ TOPS
11. ☐ PROTEON (PRONET)
12. ☐ OTHER ____________

10 What is your LAN environment? (check all that apply)

1. ☐ 4M TOKEN RING
2. ☐ 16M TOKEN RING
3. ☐ ARCNET
4. ☐ ETHERNET
5. ☐ STARLAN
6. ☐ FDDI
7. ☐ LOCALTALK
8. ☐ 10BASET
9. ☐ OTHER ________

11 Which operating systems do you utilize? (check all that apply)

1. ☐ IBM DOS (VSE)
2. ☐ UNIX
3. ☐ OS/2
4. ☐ OS/2 Extended Edition
5. ☐ MVS
6. ☐ VM
7. ☐ VMS
8. ☐ XENIX
9. ☐ PICK
0. ☐ OTHER ________

12 Please indicate by vendor the number of mainframes/minicomputers installed in your network.

VENDOR	MAINFRAMES A	MINIS B
01. DEC		
02. IBM		
03. AMDAHL		
04. AT&T		
05. BULL HN IS		
06. NCR		
07. DATA GENERAL		
08. WANG		
09. HEWLETT PACKARD		
10. PRIME		
11. TANDEM		
12. UNISYS		
13. CONTROL DATA		
14. OTHER		

13 Please indicate by vendor the number of microcomputers/workstations:

A. Presently installed in your network.

B. The approximate quantity you plan to install in the next 12 months.

MICROCOMPUTER/ WORKSTATION/ VENDOR	PRESENTLY INSTALLED A	PLAN TO INSTALL NEXT 12 MONTHS B
01. PCs based on 80286 chip		
02. PCs based on 80386 chip		
03. PCs based on 80486 chip		
04. 8086/8088		
05. Macintosh		
06. RISC-based workstations		
07. UNIX-based workstations		

14 What is your planned PC standard? (check all that apply)

1. ☐ EISA
2. ☐ MCA
3. ☐ NUBUS (MACINTOSH)

15 For which areas outside of the U.S. do you have purchasing influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East

16 Check ALL that apply in columns A and B

A) I am presently involved in the purchase process for the following products/services:

B) I plan to purchase the following products/ services in the next 12 months:

Presently Involved A	Plan to Purchase B	
		LOCAL AREA NETWORKS:
01. ☐	☐	Local Area Networks
02. ☐	☐	LAN Servers
03. ☐	☐	LAN Services
04. ☐	☐	Cables, Connectors, Baluns
05. ☐	☐	Bridges, Routers, Gateways
06. ☐	☐	UPS
07. ☐	☐	LAN Storage Devices
A	B	COMPUTERS/PERIPHERALS:
08. ☐	☐	Micros
09. ☐	☐	Minis
10. ☐	☐	Mainframes
11. ☐	☐	Front End Processors
12. ☐	☐	Terminals
13. ☐	☐	Laptops
14. ☐	☐	Printers
15. ☐	☐	Work Stations
16. ☐	☐	Cluster Controllers

(continued on next column)

Presently involved A	Plan to Purchase B	
		SOFTWARE:
17. ☐	☐	Network Management
18. ☐	☐	Micro to Mainframe
19. ☐	☐	Network Security
20. ☐	☐	Call Accounting
21. ☐	☐	Distributed DBMS
22. ☐	☐	Communications Software
23. ☐	☐	Applications Software
24. ☐	☐	Network Operating Systems Software
25. ☐	☐	EDI Software
26. ☐	☐	E-Mail Software
A	B	DATA COMMUNICATIONS:
27. ☐	☐	Modems (over 9.6kbps)
28. ☐	☐	Modems (under 9.6kbps)
29. ☐	☐	T-1 Multiplexers
30. ☐	☐	T-3 Multiplexers
31. ☐	☐	Fractional T-1 Multiplexers
32. ☐	☐	Data Switches
33. ☐	☐	Matrix Switches
34. ☐	☐	Packet Switches
35. ☐	☐	Protocol Converters
36. ☐	☐	Network Management Systems
37. ☐	☐	Terminal Emulation Boards
38. ☐	☐	Facsimile Machines
39. ☐	☐	Diagnostic Test Equipment
40. ☐	☐	DSU/CSU
41. ☐	☐	Data Security
42. ☐	☐	Data Compression Equipment
43. ☐	☐	Network Adapter Boards
44. ☐	☐	Microwave
45. ☐	☐	Messaging Software
A	B	TELECOMMUNICATIONS:
46. ☐	☐	PBXs (over 1000 lines)
47. ☐	☐	PBXs (200 - 1000 lines)
48. ☐	☐	PBXs (under 200 lines)
49. ☐	☐	Key Systems
50. ☐	☐	Automatic Call Distributors
51. ☐	☐	Voice Messaging Systems
52. ☐	☐	Video Teleconferencing Systems
A	B	SERVICES:
53. ☐	☐	Switched Voice
54. ☐	☐	Dedicated Leased Line
55. ☐	☐	T-1
56. ☐	☐	T-3
57. ☐	☐	Digital Data
58. ☐	☐	Packet Switched
59. ☐	☐	Centrex
60. ☐	☐	Central Office Lan
61. ☐	☐	Satellite
62. ☐	☐	On-Line Information
63. ☐	☐	ISDN
64. ☐	☐	EMail
65. ☐	☐	VSAT

17 Estimated value of networking equipment and services:

A: Which you helped specify, recommend or approve in the last 12 months?

B: Which you plan to help specify, recommend or approve in the next 12 months?

A	B
1 ☐	☐ $100 million and over
2 ☐	☐ $50 - $99.9 mill
3 ☐	☐ $25 - $49.9 mill
4 ☐	☐ $20 - $24.9 mill.
5 ☐	☐ $10 - $19.9 mill.
6 ☐	☐ $5 - $9.9 mill.
7 ☐	☐ $1 - $4.9 mill.
8 ☐	☐ $500,000 - $999,999
9 ☐	☐ Under $500,000

18 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ over $10 billion
2. ☐ $1 to $9.9 bill.
3. ☐ $500 to $1 bill.
4. ☐ $100 to $499.9 mill.
5. ☐ $50 to $99.9 mill.
6. ☐ $10 to $49.9 mill.
7. ☐ $5 to 9.9 mill.
8. ☐ under $5 mill.

19 Estimated number of employees for your entire corporation:

1. ☐ over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ under 500

20 Which of the following ISDN products do you plan to purchase in the next 12 months? (check all that apply)

1. ☐ Basic Rate Interface Terminal Adapters
2. ☐ Primary Rate Interface Equipment
3. ☐ Voice/Data terminals
4. ☐ Voice-only terminals
5. ☐ Data-only terminals

21 From which of the following vendors will you consider buying your PBX/Central Office Switch? (check all that apply)

A PBX	B COS	
A ☐	☐	AT&T
B ☐	☐	ALCATEL
C ☐	☐	ERICSSON
D ☐	☐	FUJITSU
E ☐		HARRIS
F ☐		HITACHI
G ☐		ROLM
H ☐		INTECOM
I ☐		MEMOREX TELEX
J ☐		MITEL
K ☐	☐	NEC
L ☐	☐	NORTHERN TELECOM
M ☐		SAMSUNG
N ☐	☐	SIEMENS
O ☐		STROMBERG-CARLSON
P ☐		TOSHIBA
Q ☐	☐	OTHER ____________

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91NN

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- DAMAC
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Glasgal Communications, Inc...201-768-8082

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Glasgal Communications, Inc...201-768-8082

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Notework Corporation 800-767-6683

E-Mail Gateways for Macintosh
StarNine Technologies (415) 548-0391
2126 6th St. Berkeley, CA 94710

Micro-to-Mainframe
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Special: Lead Service

X.25 packet switches (continued from page 38)

Company	Product	Physical interfaces	Number of ports, data rates supported	Switch configuration	Protocols supported	Private networking	Virtual circuit capacity	Throughput (packet/sec)	Frame relay support	Management	Price
Dowty Communications, Inc. Annapolis Junction, Md. (301) 317-7710	PSX-8425, PSX-8525 Packet Switches	RS-232 (V.24), X.21, V.35, X.25 or X.75 can be channelized for T-1/E-1 transport, up to 256K bit/sec (not time-division multiplexed)	Network trunks: up to 256K bit/sec; terminal ports: up to 32 (PSX8425) and up to 64 (PSX8525)	Motorola 68000 or 68020 CPU; 8- (PSX8525) or 16-slot (PSX8525) chassis, stand-alone (PSX8425) or rack-mountable (PSX8525)	Network: X.25 (1980, 1984, 1988) and X.75 (1980, 1984); no terminal protocol support on these nodal switches	Load balancing, alternate routing	4,096 (PSX-8425) and 8,192 (PSX-8525)	1,600 (PSX8425), 3,200 (PSX8525), based on 1,128-byte packet	None	Via a co-located ASCII terminal, 286/386 Xenix-based PC or Sun Microsystems, Inc. SPARCstation; redundancy options	From $11,000 to $43,000 (PSX8425); $19,000 to $78,000 (PSX8525)
	PSX8225 Packet Switch Exchange	RS-232 (V.24), X.21, V.35	Network trunks: up to 9 at up to 64K bit/sec; terminal ports: optional asynchronous or synchronous PAD, or stat mux module	Motorola 68000 CPU, multislot chassis	Network: X.25 (1980, 1984)	Serves as a feeder switch, up to 2 alternate links	256 (up to 128 per link)	50	None	Same as above	From $3,100 (5 ports); from $5,100 (9 ports)
Dynatech Communications, Inc., Woodbridge, Va. (703) 550-0011	CPX 10	RS-232 (V.24), V.35, X.21 (V.11)	Network trunks: up to 18 at up to 64K bit/sec; terminal ports: same as for network ports	Up to 3 Motorola 68000 CPUs, 3-slot chassis, rack-mountable or desktop	Network: X.25; terminal: asynchronous PAD, SDLC	Load balancing, alternate routing; no proprietary protocols used	2,048	500 (128-byte packets)	None	Via directly connected terminal or remotely via vendor's PS/2-based management system; fault and performance monitoring, configuration management, call accounting	$3,500 to $7,950
	CPX 20	RS-232 (V.24), V.35, X.21 (V.11)	Network trunks: up to 4 at up to 64K bit/sec and 8 at up to 19.2K bit/sec; optional module supports up to 4 at T-1/E-1 rate; terminal ports: same as for network ports	Up to 6 Motorola 68000 CPUs, 7-slot chassis, rack-mountable or desktop	Network: X.25; terminal: asynchronous PAD, SDLC	Same as above	2,048	1,000; up to 3,000 with optional T-1 module	Under development; currently only between CPX 20s	Same as above	$8,500 to $24,950
Ericsson Business Communications, Inc. Secaucus, N.J. (201) 319-3350	PS 10	RS-232 (V.24), RS-449, V.35	Network trunks: up to 4 at up to 256K bit/sec; terminal ports: up to 16 at up to 19.2K bit/sec	Motorola 68010 CPU, multislot chassis (4 slots available for line cards), stand-alone	Network: X.25 (1984), X.25 broadcast, X.75, QLLC; terminal: asynchronous PAD, SNA/SDLC, Univac UTS, Honeywell VIP7700, others	Load balancing over trunks, automatic overflow/redirection to external packet network via X.75, secondary path for each virtual circuit per switch, 4 traffic-priority levels	Up to 4,095 per X.25/ X.75 port, subject to memory constraints	Limited by number of call set-ups per second	Yes, currently only between vendor's nodes; frame relay traffic can coexist with any supported protocol, logically segregated over same trunks via addressing procedures	Integral hard disk for local program and configuration loading; vendor's NM 400 is a VAX/VMS-based management system, features real-time, color-graphics map and status display down to board level; performs fault, configuration, accounting/performance and security management	$17.000 hardware (12 port); $325 to $625 annual license per software module
	PS 500	RS-232 (V.24), RS-449, V.35, T-1/E-1 (nonchannelized output)	Network trunks: up to 2 at up to T-1/E-1 rates per switch module (up to 32 switch modules in fully expanded system); terminal ports: up to a maximum of 52 ports per switch module (maximum of 1,528 ports per system)	Motorola 68030 CPU, single-, dual- or multiple-chassis configuration, 13 slots per chassis, single-or multiple-cabinet, stand-alone	Same as above	Same as above	Same as above	About 180 per switching module (up to 32 modules in fully expanded system)	Same as above	Same as above	From $50,000 (25-port base model) to more than $2 million (1,500-port system) for hardware; $325 to $625 annual license per software module
Hughes Network Systems, Germantown, Md. (301) 428-5500	9708MX	RS-232, V.35, RS-422/423	Network trunks: up to 8 at up to 64K bit/sec; terminal ports: same as network ports	Intel Corp.186 16-bit CPU fixed configuration, desktop	Network: X.25 (1980, 1984), DSP; terminal: asynchronous, 3270 SNA and BSC, SNA/SDLC, 2780/3780 BSC, Uniscope, polled asynchronous; X.21 addressing	Proprietary LAP-B backbone protocol; dynamic routing, virtual circuit reroute and reconnect	192	60	Yes; frame relay traffic combine with X.25 packets on same trunks, logically separated	Vendor's Network Control System; up to 15 operator consoles; remote monitoring, reconfiguration; graphic interface; links to Digital Equipment Corp., IBM NetView, other management systems	About $7,000
	9724 RX	RS-449, V.35, RS-422/433, RS-232, EIA 530, X.21	Network trunks: up to T-1/E-1; terminal ports: up to 32 ports per node	Multiple Intel 16-bit CPUs, 4-slot chassis, stand-alone	Network: X.25 (1980, 1984), X.75 (1984), DSP; terminal: asynchronous, 3270 SNA and BSC, SNA/SDLC, 2780/3780 BSC, Uniscope, polled asynchronous; X.21 addressing	Same as above	768	600	Same as above	Same as above	$12,000 to $67,200
	9760 CX	RS-449, V.35, RS-442/443, RS-232, EIA 530, X.21	Network trunks: up to T-1/E-1; terminal ports: up to 92 ports per node	Multiple Intel 16-bit CPUs, single multislot chassis, stand-alone	Same as 9724 above	Same as above	2,560	3,000	Same as above	Same as above	36,300 to $120,000

SOURCE: MIER COMMUNICATIONS, INC., PRINCETON JUNCTION, N.J.

X.25 packet switches (continued on page 52)

Company	Product	Physical interfaces	Number of ports, data rates supported	Switch configuration	Protocols supported	Private networking	Virtual circuit capacity	Throughput (packet/sec)	Frame relay support	Management	Price
Hughes Network Systems (continued)	9000 NX	RS-449, V.35, RS-442/433, RS-232, EIA 530, X.21	Network trunks: up to T-1/E-1; terminal ports: up to 768 ports per node	Multiple Intel 16-bit CPUs, multiple multislot chassis, rack-mountable	Network: X.25 (1980, 1984), X.32, X.75, DSP; terminal: asynchronous, 3270 SNA and BSC, SNA/SDLC, 2780/3780 BSC, Uniscope, polled asynchronous	Same as above	More than 20,000	More than 7,000	Same as above	Same as above	$44,600 to $900,000
Memotec Data, Inc. Montreal (514) 738-4781	SP/MP 9500 Switch Node	RS-232, V.35, RS-449, X.21	Network or terminal ports: from 6 to 54 per node, maximum data rate not specified	Zilog 280 CPU, 1 to 10 slots per chassis, rack-mountable or desktop	Network: X.25, X.32, X.75, QLLC, DSP; terminal: asynchronous PAD, HP Enq/Ack	Load balancing, automatic alternate routing; employs OSI transport protocol Class 4	6,696 per node	2,250	Under development	Vendor's PC-based network management system; remote configuration, statistics collection, reporting; interface to DEC management system	$7,195 (6 port) to $62,295 (54 port)
Micom Communications Corp. Simi Valley, Calif. (800) 642-6687	MBE-V12	V.35, X.21, RS-232, 802.3 Ethernet LAN	Network trunks: up to 16 at up to 128K bit/sec; terminal ports: same as network ports; optional LAN module supports 10M bit/sec X.25 connection via Ethernet	Motorola 68000 CPU, VME architecture, 12-slot chassis, stand-alone or rack-mountable	Network: X.25 (1984), X.32, QLLC, TCP/IP; terminal: asynchronous PAD, SNA/SDLC, BSC, HDLC; TCP/IP (supported over LAN via optional 802.3 gateway)	Load balancing; automatic rerouting in event of line failure; OSI transport protocol Class 4 support; address translation	1,500 (concurrently active)	550	None	Vendor's 386 Xenix-based Network Management System; centralized alarm monitoring, collection and storage of network statistics, configuration, and billing/accounting records	$8,750 to $50,000
	MBE-V21	V.35, X.21, RS-232, 802.3 Ethernet LAN	Network trunks: up to 34 at up to 128K bit/sec; terminal ports: same as network ports; optional LAN module supports 10Mbit/sec X.25 connection via Ethernet	Motorola 68000 CPU, VME architecture, 21-slot chassis, stand-alone or rack-mountable	Same as above	Same as above	1,500 (concurrently active)	550	None	Same as above	$8,750 to $50,000
	MB-300	V.35, X.21, RS-232	Network trunks: 6 at up to 72K bit/sec; terminal ports: 12 at up to 19.2K bit/sec (18-port system maximum)	Zilog Z280 CPU, 3-card fixed configuration, desktop or rack-mountable	Network: X.25 (1984), QLLC, TCP/IP; terminal: asynchronous PAD, SNA/SDLC, BSC, HDLC; TCP/IP (supported over LAN via optional 802.3 gateway)	Load balancing; automatic rerouting in event of line failure	256 (concurrently active)	300	None	Same as above	$4,450 to $6,925
	MB3-PSW	V.35, X.21, RS-232	Network trunks: 2 at up to 72K bit/sec; terminal ports: 10 at up to 19.2K bit/sec (12-port system maximum)	Zilog Z80 CPU, 2-card fixed configuration, desktop or rack-mountable	Same as above	Load balancing	128 (concurrently active)	100	None	Same as above	$2,555 to $4,200
NEC America, Inc. Melville, N.Y. (516) 753-7000	NP140	T-1 (unchannelized); others unspecified	Network trunks: up to 72 T-1 interfaces (unchannelized) via specialized T-1 hardware; terminal ports: none, nodal switch only	Unix-based, redundant, multiple-chassis configuration; one or more rack-mountable cabinets, connected via redundant token-ring bus	Network: X.25, X.75; terminal: none, nodal switch only	X.75 is internodal protocol, supports load balancing, automatic alternate routing and multiple-link internodal connections	Up to 20,000 per switch module, up to 100 modules per system	25,000 aggregate; 32M bit/sec token-ring bus limits throughput betweeen switching modules	Under development (planned for 4Q '91)	Configuration includes network management, which communicates with vendor's MP150 management system; MP150 handles centralized configuration, billing, statistics collection	Varies widely with configuration
	AP120	V.35, RS-232	Network trunks: up to 8 at up to 128K bit/sec; terminal ports: up to 24 to 19.2K bit/sec	Packet switching cards that plug into AT-type PC; proprietary operating system on cards, interface to DOS; up to 4 cards per chassis	Network: X.25; terminal: asynchronous PAD, BSC, SDLC/SNA, 3270 SDLC/SNA, polled asynchronous	Load balancing and alternate routing via X.25 internodal links	254 per card	250	None	Communicates with vendor's MP150 management station; see above	$5,200 to $14,000
Netrix Corp., Hemdon, Va. (703) 742-6000	1-ISS Model 15	RS-232 (V.24), V.35, X.21 (V.11), T-1/E-1 (channelized on a DS0 basis or in increments of 8K bit/sec)	Network trunks: up to T-1/E-1; terminal ports: none, nodal switch only; up to 50 ports per switch	Motorola 68030 CPU, from 14 to 50 slots per system	Network: X.25, X.75 (1980, 1984, 1988), X.25 broadcast; terminal: requires separate Netrix AXP access concentrator/PAD	Dynamic adaptive routing of packet, circuit and frame relay traffic; routing control based on user or class of service; automatic virtual circuit reconnect; recovery from trunk or node failure without loss of data; X.21 addressing	500	Up to 200	Yes, frame relay traffic coexists with X.25 packets on same trunks, logically segregated	Vendor's network management system; real-time status information, configuration changes; graphic interface extends to devices over public data networks	Starts at $12,500, port cards are additional; $35,000 to $50,000 management system; $4,800 to $7,200 for vendor's concentrator/PAD
	1-ISS Model 30	Same as above	Same as above, except up to 200 ports per system	Same as above, except system supports from 19 to 300 slots	Same as above	Same as above	Up to 2,000	Up to 500	Same as above	Same as above	Starts at $18,250; otherwise same as above

ALC = Airline Link Control protocol for reservation-system terminal communications
CMIP = Common Management Information Protocol
DDCMP = Digital Data Communications Message Protocol
DSP = Display System Protocol; de facto standard for transport of BSC terminal traffic within an x.25 backbone
DTE = Data terminal equipment
LAP B = Link Access Procedure B
LAT = Local Area Transport
QLLC = Qualified Logical Link Control
SPARC = Scalable processor architecture
UTS = Univac Terminal System

SOURCE: MIER COMMUNICATIONS, INC., PRINCETON JUNCTION, N.J.

X.25 packet switches (continued on page 54)

Company	Product	Physical interfaces	Number of ports, data rates supported	Switch configuration	Protocols supported	Private networking	Virtual circuit capacity	Throughput (packet/sec)	Frame relay support	Management	Price
Netrix Corp. (continued)	1-ISS Model 50	Same as above	Same as above, except up to 400 ports per system	Same as above, except system supports from 19 to 600 slots	Same as above	Same as above	Up to 4,000	Up to 1,000	Same as above	Same as above	Starts at $25,750; otherwise same as above
	1-ISS Model 70	Same as above	Same as above, except up to 800 ports per system	Same as above, except system supports from 19 to 900 slots; stand-alone	Same as above	Same as above	Up to 8,000	Up to 2,000	Same as above	Same as above	Starts at $29,250; otherwise same as above
	1-ISS Model 70 Cluster	Same as above	Same as above, except up to 4,000 ports per system	Same as above, except system supports from 19 to over 4,000 slots; typically multicabinet, stand-alone	Same as above	Same as above	Over 40,000	More than 10,000	Same as above	Same as above	Configuration dependent
Northern Telecom, Inc. Nashville 615) 734-4000	DPN-100/5	RS-232 (V.24), V.35, ISDN	Network trunks: up to 8; terminal ports: up to 32	Multiple Intel 386 CPUs, desktop or rack-mountable	Network: X.25, X.75, DSP, X.31 (access to ISDN packet-mode services); terminal: asynchronous PAD, SNA/SDLC, DSP for IBM 3270 BSC, polled multidrop asynchronous terminals, 2780/3780 HASP	Shortest path routing; preselected backup route for trunk failures; overflow routing mechanism for load sharing between trunk routes to alleviate congestion	Not specified	64 (128-byte packets)	Under development (planned for 1992); frame relay traffic shares trunks with traffic from all other supported protocols, including X.25	Same as above	$11,760 to $20,100 hardware; software licensed on a per network basis, ranges from $35,000 to $90,000
	DPN-100/10 and DPN-100/15	Same as above	Network trunks: up to 20 (DPN-100/10) or up to 44 (DPN-100/15); terminal ports: up to 104 (DPN-100/10) or up to 208 (DPN-100/15)	Multiple Intel 386 CPUs; modular components load in shelves, up to 3 shelf assemblies per standard rack cabinet	Same as above	Same as above	Not specified	800 (128-byte packets)	Same as above	Same as above	10 different modules cost from $23,520 to $181,070 per module; software as above
	DPN-100/20 and DPN-100/40	Same as above	Network trunks: up to 14 (DPN-100/20) or up to 16 (DPN-100/40); terminal ports: up to 176 (DPN-100/20) or up to 800 (DPN-100/40)	Same as DPN-100/10 above	Same as above	Same as above	Not specified	3,200 (128-byte packets)	Same as above	Same as above	Same as above
	DPN-100/50	Same as above	Network trunks: up to 44; terminal ports: up to 3,000	Same as DPN-100/10 above	Same as above	Same as above	Not specified	3,200 (128-byte packets)	Same as above	Same as above	Same as above
OST, Inc., Chantilly, Va. (703) 817-0400	ECOM IS-24, ECOM IS-72	RS-232, V.35, X.21, ISDN	Network trunks: up to 8 or up to 72 ports at up to 64K bit/sec; terminal ports: same as network ports (up to 8 or 72 ports per system)	Motorola 68020 CPU, 10 or 18 slots per chassis, desktop or rack-mountable	Network: X.25; terminal: asynchronous PAD, SNA/SDLC, Honeywell VIP, HDLC, BSC	Load balancing; automatic alternate routing	2,304 (maximum simultaneous)	1200	Under development (late 1991, early 1992)	Vendor's NMC 150, a Unix-based network management system; network graphics, alarm reporting; NET/PC software alternately available, runs on users' PC	$9,995 (8-port unit) to $43,295 (basic 72-port unit); some interface cards cost extra ($595 to $750); some software modules cost extra ($895 to $1,595)
	ECOM L ECOM M	RS-232, V.35, X.21	Same as above	Motorola 68000 CPU; configuration same as above	Network: X.25; terminal: asynchronous PAD, SNA/SDLC, Honeywell VIP	Same as above	Same as above	1000	None	Same as above	$7,995 (8-port unit) to $35,495 (basic 72-port unit); some interface cards cost extra ($595); some software modules cost extra ($895 to $1,595)
	PASS 25	RS-232	Network trunks: up to 64K bit/sec; terminal ports: same as network trunks, maximum of 18 ports per system	Motorola 68000 CPU, 10-slot chassis, desktop or rack-mountable	Network: X.25; terminal: asynchronous PAD, SNA/SDLC, Honeywell VIP, BSC, HDLC	Same as above	256 (maximum simultaneous)	100	None	Same as above	$4,385 (basic 4-port unit) to $8,025 (basic 18-port unit); some software modules cost extra ($895 to $1,595)

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DSP = Display System Protocol; de facto standard for transport of BSC terminal traffic within an x.25 backbone
DTE = Data terminal equipment
LAP B = Link Access Procedure B
LAT = Local Area Transport
OLLC = Qualified Logical Link Control
SPARC = Scalable processor architecture
UTS = Univac Terminal System

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X.25 packet switches (continued on page 56)

Company	Product	Physical interfaces	Number of ports, data rates supported	Switch configuration	Protocols supported	Private networking	Virtual circuit capacity	Throughput (packet/sec)	Frame relay support	Management	Price
Plantronics Futurecomms, Inc. Frederick, Md. (301) 662-5926	PAC.25 TURBO	RS-232 (V.24), V.35, RS-449	Network trunks: up to 42 at up to 64K bit/sec; terminal ports: same as for network trunks (no limitation on mixing interfaces)	Multiple Motorola 68000 CPUs, 8-slot chassis, desktop or rack-mountable	Network: X.25, X.25 broadcast, QLLC; terminal: asynchronous PAD, SNA/SDLC, HDLC, BSC 3270, 2780/3780	Vendor's routing mechanism supports load balancing, multihunt and priority schemes	255 per port	Up to 58 per port (128-byte packets)	Yes, frame relay traffic and X.25 packets can be combined on the same trunks, logically separated	Rudimentary network management included in each node; vendor's 386 Xenix-based network management system for large networks, employs proprietary message format for alarms, logging, statistical records	$4,325 to $18,392
	Micro-TURBO	Same as above	Network trunks: up to 10 at up to 64K bit/sec; terminal ports: same as for network trunks (no limitation on mixing interfaces)	Multiple Motorola 68000 CPUs, fixed configuration, desktop	Same as above	Same as above	32 per port	Up to 18 per 19.2K bit/sec port (128-byte packets); 150 pps per node	Same as above	Same as above	$1,995 to $4,130
	Nano-TURBO	Same as above	Network trunks: up to 6 at up to 64K bit/sec; terminal ports: same as for network trunks (no limitation on mixing interfaces)	Same as MicroTURBO above	Same as above	Same as above	32 per port	Up to 18 per 19.2K bit/sec port, up to 58 per 64K bit/sec port (128-byte packets); 150 pps per node	Same as above	Same as above	$1,395 to $3,710
RACAL Data Communications Sunrise, Fla. (800) 722-2555	Series 300	RS-232 (V.28), V.35, 802.3 Ethernet LAN	Network trunks: multiple X.25 at up to 72K bit/sec; terminal ports: up to 512 ports at up to 19.2K bit/sec (total of 512 ports per system)	Multiple Motorola 68000 CPUs, separate processor card per protocol, multislot chassis, desktop to rack-mountable (larger systems)	Network: X.25, TCP/IP (routing), DDCMP (DEC); terminal: asynchronous PAD, LAT (via Ethernet), 3270 BSC, SNA/SDLC, HDLC	Load balancing and automatic alternate routing via proprietary internodal protocol, security features via special software	512 per 2-port, X.25 trunk module	90,000 character/sec per system (varies with variable packet sizes)	None	Vendor's 300 Network Management System manages entire packet network from central site; network map, alarms, connection, traffic statistics	From $8,175; additional software and hardware required, depending on configuration and protocol requirements
	DPAX 1100/ 2100	RS-232 (V.28), X.21 (V.11), V.35	Network trunks: up to 2 at up to 72K bit/sec; terminal ports: up to 80 at up to 19.2K bit/sec	Multiple Motorola 68000 and Zilog Z80 CPUs, desktop or rack-mountable	Network: X.25; terminal: asynchronous PAD	Same as above	1 per port; up to 80 logical connections total per system	26,880 character/sec, per system (varies with variable packet sizes)	None	Up to 4 operator consoles for configuration and management supported; also supported by 300 NMS (see above)	From $4,595
Sprint International/US Sprint Communications Co. Reston, Va. (703) 689-6000	TP3025	RS-232, V.35	Network trunks: up to 2 at up to 64K bit/sec; terminal ports: up to 8 at up to 19.2K bit/sec	Zilog Z80A CPU, fixed configuration, desktop or rack-mountable	Network: X.25; terminal: none specified	Load balancing over two network trunks	Not specified	Up to 100	None	Statistics collection, multilevel priority; other wise via vendor's TP5000 management system	Varies with configuration
	TP3325	RS-232 (V.24/V.28), V.35	Network trunks: up to 2 at up to 64K bit/sec; terminal ports: up to 52 at up to 19.2K bit/sec	Zilog Z80A CPU, multislot chassis, stand-alone, desktop or rack-mountable (depending on configuration)	Network: X.25, QLLC; terminal: asynchronous PAD, SNA/SDLC, 3270, 2780/3780 BSC	Same as above	Not specified	Same as above	None	Same as above	Varies with configuration
	TP8000	RS-232 (V.24), X.21 (V.11), V.35	Network trunks: up to 16 at up to 64K bit/sec; terminal ports: same as network trunks, can be any mix	Motorola 68030 CPU, desktop or rack-mountable	Network: X.25, QLLC; terminal: asynchronous PAD, SNA/SDLC	Load balancing, call reconnect, call redirect, internetwork gateway (address translation)	Not specified	Up to 400	None	Access security, statistics collection, multilevel priority; also managed by TP5000	Varies with configuration
	TP4800	RS-232, X.21 (V.11), V.35	Network trunks: up to 224 at up to 64K bit/sec; terminal ports: same as network trunks, can be any mix	Motorola CPU, multislot chassis, stand-alone	Network: X.25, X.25 broadcast, QLLC; terminal: asynchronous PAD, SNA/SDLC, 2780/3780 BSC	Same as above	Not specified	Up to 4,000	None	Same as above	Varies with configuration
	TP4900	RS-232, X.21 (V.11), V.35, DB-15, RJ-48X	Network trunks: multiple at up to T-1; terminal ports: device lines also supported to T-1 rates; up to 3,000 ports/lines per system	Motorola 68020 and 68030 CPUs, multislot, multichassis configuration, stand-alone	Network: X.25, X.25 broadcast, QLLC; terminal: asynchronous PAD, SNA/SDLC	Same as above	Not specified	Up to 10,000; up to 70,000 frame relay 128-byte frames per sec	Yes, frame relay traffic and X.25 packets supported over same trunks, logically segregated	Same as above	Varies with configuration

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LAT = Local Area Transport
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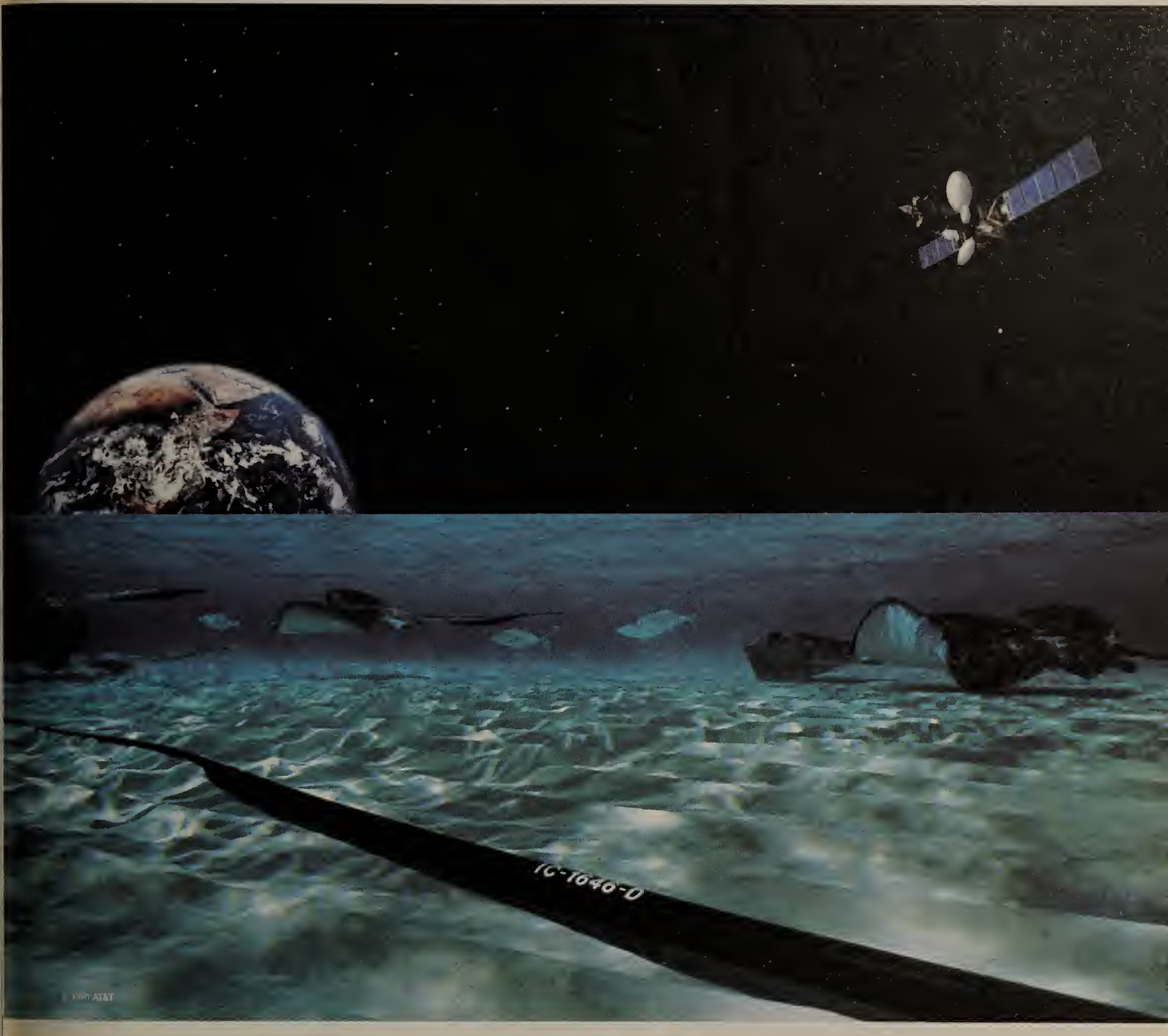

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X.25 packet switches (continued from page 54)

Company	Product	Physical interfaces	Number of ports, data rates supported	Switch configuration	Protocols supported	Private networking	Virtual circuit capacity	Throughput (packet/sec)	Frame relay support	Management	Price
Sync Research, Inc. Irvine, Calif. (714) 588-2070	Network Access Controller	RS-232, V.35, RS-422, RS-449	Network trunks: up to 10 at up to 64K bit/sec; terminal ports: up to 20 (maximum ports per system)	Intel 80288 and 80186 CPUs, 5-slot PC/AT-based configuration (proprietary operating system)	Network: X.25, DSP, QLLC; terminal: asynchronous PAD, 3270 SNA/SDLC, 3270 and 2780/3780 BSC, Univac UTS, Burroughs Poll/Select, NCR Poll/Select	Load sharing of traffic based on virtual circuit count; local switching	256	50	Yes, X.25 and frame relay trunks can run concurrently or else X.25 packets can be transported over a frame relay interface	Built-in user ID and password network-access security; vendor offers Unix workstation-based SyncView management system, features real-time configuration, collection of alarms and billing statistics	$5,450 base unit (4 port); $200 to $500 per module for protocol software
Telefile, Inc. Irvine, Calif. (800) 854-3128	Tele-SWITCH Plus	RS-232 (V.24), V.35, X.21 (V.10/V.11), T-1/E-1, including fractional T-1	Network trunks: multiple at up to T-1/E-1; terminal ports: up to 544 ports may be supported simultaneously per system	Multiple Motorola 68000/020/030/040 CPUs, VME bus architecture, multislot chassis, stand-alone or rack-mountable	Network: X.25. X.75, TCP/IP and IPX (via optional, integrated LAN routers); terminal: asynchronous PAD, BSC, SDLC, Poll/Select protocols	Automatic alternate routing, rerouting of calls and data from failed links, automatic generation and update of network connection maps; employs OSI transport protocol for internodal links	Up to 4,095 per link (system maximum of 544 links)	From 1,162 to 7,500 per switching module	Yes, frame relay traffic and X.25 packets supported over same trunks, logically segregated	Vendor offers 2 management systems, 386 PC- or Sun SPARCstation-based; currently proprietary management protocol encapsulated in X.25 packets, SNMP support planned for 4Q '91	$10,440 to $134,000; secial link adapters and optional modules cost from $3,995 to $7,995 each
Telematics International, Inc. Fort Lauderdale, Fla. (305) 772-3070	PCPS 240	RS-232 (V.24), RS-449, V.35, 802.3 Ethernet LAN (optional, max 1 per system)	Network trunks: up to 12 at 64K bit/sec, maximum network link speed is 256K bit/sec; terminal ports: up to 34	Multiple Motorola 68020 CPUs, multislot chassis, stand-alone	Network: X.25 (1980, 1984, partial 1988), LAN-to-WAN routing supports OSI and TCP/IP environments; terminal: available optionally or via separate PAD/concentrator (including asynchronous PAD, BSC)	Vendor's proprietary transport-level protocol supports automatic call reconnection, multilevel security, traffic priority	Not specified	Over 500	None	Vendor's NET25 network management system for configuration, centralized control, monitoring, statistics; provides X.25/X.75 gateway service	Varies with configuration
	PCPS 4500	RS-232 (V.24), RS-449, V.35, RS-530 (for full or fractional T-1/E-1)	Network trunks: multiple up to T-1/E-1 (to 11M bit/sec throughput per system); terminal ports: up to 480 per system	Multiple Motorola 68020 CPUs, 17-slot chassis, stand-alone	Network: X.25, X.75; terminals: asynchronous PAD, SDLC, 3270, 2780/3780 BSC, Burroughs poll/select, ALC	Same as above	Not specified	Up to 1,600	None	Status LEDs or local operator console; also supported by NET25 system (see above)	Varies with configuration
Timeplex, Inc. Woodcliff Lake, N.J. (201) 930-4600	NP100E	RS-232 (V.28), V.35, RS-449/422 (V.11), RS-449/423 (V.10)	Network trunks: up to 64K bit/sec; terminal ports: up to 20 ports maximum per system	National Semiconductor 32016 CPU, 5-slot chassis, desktop or rack-mountable	Network: X.25, QLLC; terminals: asynchronous PAD, SDLC, character-oriented protocols	Proprietary trunk protocol supports packet-by-packet routing; algorithm considers delay, link failures, congestion; automatic routing-table generation and update	1,000 per port	120	None	Multiuser network management is integral to the system; supports encryption/security; optionally, vendor's Time/View 2500 element management system may be installed for remote, central-site management	$4,990 (4 ports) to $10,590 (20 ports)
	NP500	Same as above	Network trunks: up to 128K bit/sec; terminal ports: up to 28 ports maximum per system	National Semiconductor 32016 CPU, 7-slot chassis, desktop or rack-mountable	Same as above	Same as above	1,000 per port	500	None	Same as above	$12,945 (4 ports) to $31,645 (28 ports)
	NP1000	Same as above	Network trunks: up to 256K bit/sec; terminal ports: up to 28 ports maximum per system	National Semiconductor 32032 CPU, 7-slot chassis, desktop or rack-mountable	Same as above	Same as above	1,000 per port	1,000	None	Same as above	$18,550 (4 ports) to $37,250 (28 ports)
Trillium Digital Systems, Inc., Los Angeles (213) 312-0036	Multilink portable software	Depends on hardware platform (not included)	Software system supports X.25 links at up 64K bit/sec; hardware dependant	Modular software has been ported to numerous platforms, including Intel 80X86, Motorola 680X0	Network; X.25 (1984, 1988), X.75 (separate software product); terminal: protocol and PAD/conversion software modules also available from vendor	Various routing options are user-configurable	Varies with hardware platform	Varies with hardware platform	Separate frame relay software can co-reside with vendor's X.25 software; traffic received via a frame relay interface can mix with X.25 packets on the same trunk, logically separated	Software product, not management system specific; software includes configuration, statistics, status, accounting, control functions	X.25 Layer-3 software license costs $9,000 to $30,000; Layer-2 (LAPB) software license costs $17,000; frame relay software license costs $15,000 to $31,000; X.75 software license costs $41,000; asynchronous PAD software license costs $30,000

ALC = Airline Link Control protocol for reservation-system terminal communications
CMIP = Common Management Information Protocol
DDCMP = Digital Data Communications Message Protocol
DSP = Display System Protocol; de facto standard for transport of BSC terminal traffic within an x.25 backbone
DTE = Data terminal equipment
LAP B = Link Access Procedure B
LAT = Local Area Transport
QLLC = Qualified Logical Link Control
SPARC = Scalable processor architecture
UTS = Univac Terminal System

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EDI billing gaining acceptance

Both users and carriers are enthused by early industry acceptance of the ANSI X12 Consolidated Service Invoice/Statement (Transaction Set 811) for billing of telecommunications services via electronic data interchange.

Transaction Set 811 was created by the Telephone Bill Working Group (TBWG). TBWG is a subcommittee of the Telecommunications Industry Forum, a guideline-setting organization serving the telecommunications industry. The transaction set was voted on by the ANSI X12 group last fall and is expected to become a draft standard this June.

AT&T, Pacific Bell, Southwestern Bell Telephone Co. and US West Communications, Inc. are among the carriers using, testing or planning to test the transaction set with selected customers. Texas Instruments, Inc. and Union Pacific Railroad are two users involved in these trials.

Ronald Tuccitto, senior manager of business planning for Union Pacific Railroad in Omaha, Neb., said his company plans to participate in EDI billing trials of Transaction Set 811 with US West Communications and Southwestern Bell Telephone within the next few months. He said there are a host of potential benefits associated with receiving bills via EDI.

"One of the benefits of EDI billing," Tuccitto said, "is that you process bills faster and can pick up on phone system fraud or abuse that you might not capture as quickly by other means. If you find out about something like that five days later, it could cost you thousands of dollars."

Donna Grindler, a systems manager at Southwestern Bell Telephone, said her company first tested EDI billing using ANSI X12's Transaction Set 810, a generic invoice transaction set. Transaction Set 811 is better because it is specially designed for service providers. It also enables telephone companies to offer summary billing as well as call detail and recurring monthly charge information.

Carl Doenitz, a member of US West Communications' technical staff in Bellevue, Wash., and former chairman of the TBWG, noted that Transaction Set 811 is now being perused by companies in the insurance, electric utility and petroleum industries. "That makes us feel good," Doenitz said. "We've created a real generic service industry invoice."

— Bob Brown

PacBell to test EDI billing service

continued from page 2

1,000 or 2,000 pages."

The EDI billing trial involves extracting customers' billing information from files in Pacific Bell's northern California billing center, translating that information into an ANSI X12 format at a Pacific Bell facility in San Ramon, Calif., and dumping it into a mailbox on Sears Technology Services, Inc.'s value-added network.

Customers can then dial into the mailbox to download billing data into their own processors, where it can be analyzed.

The test will evaluate the ANSI X12 Consolidated Service Invoice/Statement (Transaction Set 811), which observers said will likely become an ANSI draft standard next month (see "EDI billing gaining acceptance," this page).

Wider availability

"The beauty of EDI is that with [standards-based] software commercially available, anyone can read and interpret these bills," Blake said.

During the six-month trial, Pacific Bell will send users summaries of their bills. Provided that the carrier gets the go-ahead from the California Public Utility Commission to extend the trial into a second phase, Pacific Bell will also transmit call detail data via EDI, he said.

Other potential EDI services would include allowing customers to pay bills and order services via EDI, though no such formal plans are in place yet at Pacific Bell, Blake added.

Pacific Bell, which uses EDI for purchasing and invoicing within its general procurement department with more than 160 trading partners, has not determined whether to charge users for receiving bills via EDI.

But carrier officials familiar with the trial said the service will probably be offered free of charge.

Jim Oravec, EDI program manager at Tandem, said he expects EDI billing will make bill processing much more efficient at his company. Currently, Tandem receives bills on paper and must input them into computers in both the telecommunications and accounting departments, he said.

With EDI, Tandem won't have to input the data at all, which will avoid data entry errors and save time, he added.

"The processing of paper is labor-intensive," Oravec said. "We believe that EDI invoicing will increase the volume of bills handled without increasing staff resources, providing a great business management tool." ◘

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Imaging users attest to gains

continued from page 3

Texas Utilities was making 10 million copies of drawings per month, and engineers had to spend up to three hours waiting for site plans to be retrieved from microfilm, Taylor said.

The company awarded IBM a contract in May 1990 for a system it called the Integrated Retrieval Project.

The system, largely complete today, will eventually include as many as 1,000 IBM PS/2 workstations functioning as view or scanning stations, and 32 Fujitsu, Ltd. and ScanGraphics, Inc. scanners or print workstations with Minolta Corp. and VersaTech, Inc. printers.

A modified version of IBM's ImagePlus software will provide the imaging and document management, and an unspecified number of IBM 3270 workstations will act as indexing terminals for document reference. Texas Utilities has scanned 6,500 of the 35,000 pages it intends to archive into the imaging system.

The imaging data is being centrally stored on an IBM MVS/ESA-based mainframe 90 miles away in Dallas, meaning the workstations on the company's 100M bit/sec Fiber Distributed Data Interface LAN have to be linked to the remote host using four dedicated T-1 lines.

Randall noted that as many as six T-1 lines between Glen Rose and the Dallas data center may eventually be needed to handle the anticipated 8,500 document retrieval requests per day.

In spite of the T-1 costs, Randall said the imaging project would pay for itself in 2½ years by eliminating the need to hire 40 to 50 workers.

At AIIM, FileNet Corp.'s MS-DOS Window 3.0-based WorkFlo software received kudos from American Airlines, Inc.

WorkFlo can be used to exchange image data with other software applications, such as spreadsheets, and has queuing capabilities to direct and monitor the flow of image files from station to station on a network.

At its Dallas headquarters, American Airlines' SABRE travel information network is nearly finished adding 105 image-enabled terminals alongside its 152 standard data processing terminals in four token rings running Novell, Inc.'s NetWare.

The goal is improved customer service for the 17,000 travel agents that use the SABRE reservation network.

"We answer 3,000 phone calls a day," said Joe Gagliardi, manager of financial services at American Airlines. The agents no longer have to place people on hold to find paper files because an image can be called up instantly on a computer screen.

Firms look to imaging partnerships

WASHINGTON, D.C. — Eastman Kodak Co. and GTE Contel Corp. announced last week similar strategies that pin their future success in the growing imaging market on partnership agreements with other vendors.

At the Association for Information and Image Management (AIIM) trade show here, GTE Contel launched GTE Contel Commercial Systems Group as its new imaging and multimedia business, while Eastman Kodak, retrenching in the imaging software market, allied itself with Lotus Development Corp.

Eastman Kodak's Commercial Imaging Group, a supplier of imaging software, document scanners and optical jukebox mass-storage devices, conceded that sales of its existing Kodak Image Systems 4000 and 5000, introduced in 1987, have been disappointing.

Taking a new tack, the company announced that its latest software product, the Document Image Management System (DIMS), due out early next year, will be marketed by Lotus as an added feature to Lotus Notes groupware. The combination will enable customers to compress Notes documents for storage and transferal as images.

James Zarnick Jr., a product manager at Eastman Kodak's Integration and Systems Products Division, said the company itself will not sell DIMS. "One of the reasons we're partnering with Lotus is because we don't have the [sales] channel. We need access to the Lotus marketing channel to put the [DIMS] software out," Zarnick said.

Eastman Kodak intends to establish similar partnerships with other groupware software vendors, systems integrators and local-area network operating system vendors, Zarnick said.

Allan Harris, director of the image practice at Ernst & Young, a New York consultancy, said the partnership is a good solid business move for Eastman Kodak due to the increasing focus on LAN-based imaging systems.

Harris noted that the imaging market, now dominated by IBM, Wang Laboratories, Inc. and FileNet Corp., is competitive, although many smaller companies are finding a niche.

> "One reason we're partnering with Lotus is we don't have the [sales] channel."

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GTE Contel dives in

Chantilly, Va.-based GTE Contel Commercial Systems, the newly announced GTE Contel subsidiary, is offering imaging and multimedia systems under the rubric "Vantage Solutions."

GTE Contel Commercial Systems' entrance into the imaging market is bolstered by partnership agreements with small companies providing imaging expertise and high-end systems dealers such as Novell, Inc.'s Platinum sellers, the most highly trained Novell dealers.

Tom Magazzine, vice-president and general manager of GTE Contel Commercial Systems, said the alliances with 15 technology companies and 15 sales agents form the core of GTE Contel Commercial Systems' effort to win new contracts for installing imaging and multimedia systems. He said the company wants to have similar agreements with 150 agencies by 1993.

"As a telecommunications company, we will provide the networking skills that we think are critical to the success of multimedia imaging," said Magazzine, noting that imaging systems are increasingly being installed in LAN and wide-area configurations.

At the AIIM show, GTE Contel Commercial Systems demonstrated an imaging software package that also allows computer-based videoconferencing and voice storage.

Magazzine said the company has already secured contracts with the Federal Deposit Insurance Corp. and Metropolitan Bay Transit Authority in Boston, among others, to install imaging systems.

However, some analysts questioned how easy it will be for GTE Contel Commercial Systems to penetrate the imaging market.

"I don't see a much different approach from other companies such as IBM," said Harris, who noted that Big Blue often calls on smaller high-tech firms for special applications. However, he said other telecommunications firms, including the regional Bell holding companies, are likely to see the imaging market as an attractive arena to enter, particularly as systems are increasingly being networked.

— *Ellen Messmer*

Apple offers System 7 OS

continued from page 1

for example, will enable a user to work on a word processing program in the foreground while printing a file on a network-attached printer.

System 7.0 also lets users cut, copy and paste between applications, whether the applications are on the user's own machine or another.

With the new operating system, customers can simply take a System 7.0 Macintosh out of the box hook it up with the LocalTalk hardware provided — or the user's own EtherTalk connections — to other System 7.0 Macintoshes. The devices can then begin sharing files immediately without loading a network operating system or installing a file server, Apple said.

System 6.0 required a dedicated server and use of the AppleShare network operating system, which implements the AppleTalk protocols necessary for networking.

With System 7.0, users can set up individual user profiles, which include passwords that are automatically encrypted, and then specify entire work groups, defining who can access which files.

The combination of multitasking and peer-to-peer capabilities gives customers built-in multiuser networking, meaning multiple users can share files simultaneously.

The downside of this equation is that users must be running System 7.0 in a peer-to-peer configuration to obtain the multiuser advantages. Analysts said most customers already have server-based local-area network environments.

Peer-to-peer capabilities are geared toward smaller customers as a way to save money, eliminating the need for file servers. But users agree this will not change the face of networking as we know it today.

"We won't use peer-to-peer in the foreseeable future, although it'll be good to have down the road," said Price Collins, program manager for office automation at General Electric Co. in Bridgeport, Conn.

Other advances built into System 7.0 will not show up until third-party software developers create System 7.0 applications. Publish and Subscribe, for example, is a feature of the operating system that will enable applications written to it to assure that information throughout a network is up to date.

If, for instance, information in a System 7.0 spreadsheet was copied onto an invoice and the data on the spreadsheet changed, the information on the invoice would automatically be updated as well.

Other System 7.0 networking enhancements include compatibility with System 6.0. For users in mixed System 6.0/System 7.0 environments, System 7.0 Macintoshes and System 6.0 servers can act as peers while System 6.0 clients would view the System 7.0 machines as servers. System 7.0 Macintoshes, however, cannot access files on System 6.0 clients.

User disappointment

Analysts were not the only ones disappointed by System 7.0. According to users, Apple did not pay enough attention to networking. The key networking features were the peer-to-peer capabilities, which a majority of current customers probably will not use.

"Apple's primary achievement after three years has been a PostScript clone," Collins said, referring to font enhancements included in System 7.0 The offering does not include the more advanced multitasking, where the user can prioritize tasks, or multimedia networking capabilities that Collins wanted.

"What [System 7.0] does, it does well," said one user who asked not to be named. "But is it a Unix operating system? No. Does it have prioritized user scheduling? No. It's still basically the Macintosh operating system."

Other sources questioned whether users would really need to upgrade to System 7.0. "System 7 is not a big networking deal," said the president of a Houston-based consultancy who requested anonymity. "I'd think twice before upgrading — at least wait until the smoke clears."

Toll fraud victims

continued from page 3

were about $1,000 higher than usual and immediately contacted AT&T to check for problems. "Subsequently, the company received a letter from AT&T indicating that the bills in question did not reflect actual usage and that they were the result of billing errors," the firm said. AT&T said it would issue the firm a credit.

But Perkin-Elmer did not receive the credit and remained in contact with AT&T about every other week through January 1990. During that period, hackers were dialing into the PBX and trying to crack the three-layer code system. In May 1990, they were apparently successful because Perkin-Elmer received bills totaling more than $187,000 for May, June and July, although its bills were typically no more than $3,000 per month.

In a letter dated Aug. 30, 1990, more than two years after it was initially informed of the suspected problem, AT&T notified Perkin-Elmer that it had been the victim of toll fraud and said the firm was liable for the full amount of charges.

RISC System/6000 takes on big role

continued from page 2

Transmission Control Protocol/Internet Protocol nets, and IBM business partner International TeleManagement Corp. announced a RISC System/6000-based tool for managing non-Systems Network Architecture devices.

Williams said both announcements show the RISC System/6000 will play an increased role in net management as IBM attempts to distribute more management functions, thus easing NetView's burden and preserving costly mainframe cycles. For example, MAXM lets users automate alarm responses from non-SNA devices as well as filter out many low-priority ones.

Users like the idea of automating responses to alarms before they reach NetView. "You should automate as close to the source as possible," said Bud Turner, director of data center services at McKesson Corp., a large wholesale distributor of pharmaceuticals and dry goods based in San Francisco. Automation close to the source means faster responses to problems, less management traffic and less burden on NetView.

In addition, filtering most alerts and sending only those requiring attention to NetView relieves NetView of the task of looking for urgent alarms and thus preserves valuable mainframe cycles, Turner said.

> Williams said IBM is trying to provide all its workstation-based management tools on both OS/2 and AIX.
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Users and analysts agree that the RISC System/6000 is well suited for such filtering applications because it offers more processing power per dollar than mainframes. And it is powerful enough to manage both lower-layer LAN error messages, which is what the IBM LAN Network Manager does, and applications, which is currently NetView's role, Williams said.

Expanded supplier base

Some users and analysts said third-party suppliers will be more inclined to develop products for use on the RISC System/6000 because it is Unix-based. Until now, IBM has pushed OS/2 as the operating system of choice for third-party management applications, such as those for NetView/PC.

"There are a lot more [net management] applications built under X Windows [Unix] environments than there are built under OS/2," Turner said.

Lawrence vanGoethem, director of systems support and telecommunications at Sara Lee Corp., agreed that more net management software is available for Unix than for OS/2. "The Unix environment has been around a fairly long time, and there is a plethora of third-party software out there," he said. "That's certainly not true of OS/2."

Others said the operating system is not as important as having common application program interfaces. That's what IBM and HP hope OpenView will provide.

Williams said IBM is trying to provide all its workstation-based management tools, such as LAN Network Manager, on both OS/2 and AIX in order to meet the demands of users that have invested in one operating system but not the other.

Not everyone thinks that's a good idea.

"That does not give you a sense of an integrated strategy," said Atul Kapoor, vice-president of Kaptronix, Inc., a consultancy in Haworth, N.J. He said it showed IBM was reacting to customer needs rather than proactively anticipating them.

Bill Maybaum, vice-president at Fidelity Service Co., the technology arm of Fidelity Investments, Inc., an investment firm in Boston, had a different view.

"I'd like to be able to adjust the tool to the scope of the effort and the size of the job, rather than always having a sledge hammer as the smallest hammer you can pound nails with," Maybaum said.

For example, remote users could manage some local-area network functions locally using a subset of OpenView running on a Personal System/2 under OS/2, while others could be performed centrally with the AIX version, he said.

Such capabilities would begin to fulfill the promise of SAA, which pledged application portability and interoperabilty of applications running under different operating systems.

Maybaum and others said IBM should make AIX part of SAA, and Williams said the company will likely do just that.

"When we talk about it now, we say SystemView is the structure of network and systems management within SAA and AIX," he said. "And the line is blurring so much that I think eventually we will declare AIX part of SAA."

Williams said only trifling architectural questions are holding up the move because some functions of AIX are not supported or do not work quite the same on other IBM platforms. Among them is the NetView Graphics Monitor Facility, the OS/2-based NetView graphical interface. Williams said that is one product IBM is having a difficult time porting to AIX.

"We'll see that merge coming, but it is taking some time technically," he said. ☐

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Firm plans for European net

continued from page 6

SNA traffic is routed from terminals and personal computers at Dun & Bradstreet offices throughout Europe over dedicated analog and digital circuits to multiple data centers in Frankfurt, London and Paris.

Conner said the new European network will reduce Dun & Bradstreet's European communications expenditures by about 10%, mostly by leveraging economies of scale.

The European network will be managed from a DunsNet network control center in Frankfurt during the business day. At other times, the net will be managed from DunsNet's net control center here, which will be linked into the European net via multiple digital circuits spanning the Atlantic.

Conner said the European network mirrors the evolution of DunsNet's U.S. network. About three years ago, DunsNet installed an NET-based T-1 backbone network throughout the U.S. that merged both SNA and X.25 traffic.

He said DunsNet installed the U.S. network because prices had declined to the point that a T-1 backbone became cost-effective. He added that European pricing has declined, making the fractional T-1 backbone cost-effective.

DunsNet's Allan Conner

Feature supports Vnet, Vision calls

continued from page 6

Westinghouse Communications' telecommunications systems director. "Over two thousand of our employees already have and use MCI Vnet cards, and many travel overseas."

Analysts applauded MCI's international calling card plans.

"This is a major international push for MCI," said Daniel Briere, president of TeleChoice, Inc., a Montclair, N.J., consultancy. "This was a big limitation to MCI's calling card — a limitation that AT&T and US Sprint addressed some time ago."

The price list

Under Global Reach, Vnet and Vision users pay the same per-call surcharge and usage fee. Customers are assessed a $2 surcharge for each call from most countries to the U.S.

Calls from the U.K. cost $1.43 for the first minute and 93 cents for each additional minute. Calls from Germany cost $1.68 for the first minute and $1.03 for each additional minute, while calls from Japan cost $3.15 and $1.17, respectively.

Calls from France cost $1.68 for the first minute and $1.03 for each additional minute, while calls from Israel cost $2.95 and $1.18, respectively.

Calls from Canada cost 25 cents for the first 30 seconds and 5 cents for each six seconds thereafter and carry an 80-cent surcharge.

Calls from Puerto Rico and the U.S. Virgin Islands cost 25 cents for the first minute and 25 cents for each additional minute and carry a $1.25 surcharge.

DEC adds low-end router

continued from page 6

routers that support IS-IS.

Cooper said DEC may also add software that will enable the DECrouter 150 to route other vendors' protocols such as Novell, Inc.'s Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX).

The DECrouter 150 is available now and costs $3,250.

DEC also introduced Version 2.0 of its software for the DECserver 300. Cooper said the announcement makes good on DEC's promise to enable the terminal server to provide access to hosts running Telnet for terminals or microcomputers emulating terminals ("DEC to offer Telnet on DECservers," *NW,* Dec. 10, 1990). Previously, DECserver 300s could only provide access to hosts running DEC's Local Area Transport protocol.

All new DECserver 300s will include the upgraded software and existing users covered under service contracts can upgrade to the software at no cost. DECservers connect as many as 16 terminals to an Ethernet and cost $4,700. Terminals communicate asynchronously with the DECserver 300 at 19.2K bit/sec.

DEC also introduced DECserver 300 for MS-DOS Version 2.0, which allows microcomputers running DEC's PathWorks for DOS Version 3.0 to download configuration files to the DECserver 300, obviating the need to use a VAX for downloading. Available later this month, the software costs $650.

In addition, DEC unveiled DECnet/SNA Data Transfer Facility Version 3.0. The software consists of two modules. One module runs on DEC's line of VAX-, MicroVAX- or VAXstation-based DECnet/SNA Gateway hardware, which provides a link between VAXes and IBM mainframes or other runs on an IBM host.

In addition to VM support, the new release can utilize idle processing cycles on a VAX or IBM host to convert file formats instead of forcing the system initiating the file transfer to perform the task.

The new release will be available in June. A package consisting of DECnet/SNA Gateway operating software plus software supporting file transfer with VM-based systems costs $50,000, while a similar package supporting file transfer with MVS-based systems costs $60,000.

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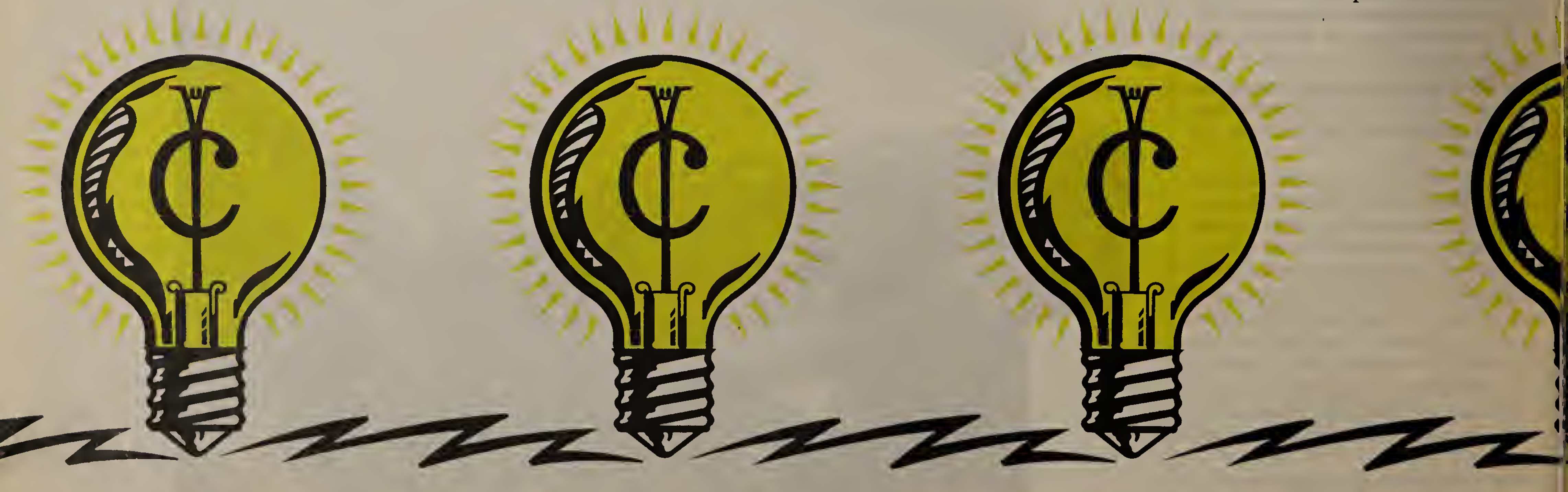

Hub vendors bolster tools

continued from page 1

ing manager at the Harris Methodist Health System in Fort Worth, Texas, which has more than 20 Ungermann-Bass, Inc. Access/One hubs. "Network management really wasn't a major factor. Were we to buy an intelligent hub today, net management would be near the top of the list [of decision factors] given the increased size of our LANs."

Eric Christensen, senior network administrator at Novell, Inc. in San Jose, Calif., a Spectrum beta user, concurred.

"The hubs themselves have become commodity items based on standard hardware," he said. "For hub vendors, a strong network management offering is a must. We're using Spectrum to manage not only the hub, but routers attached to the hub and even the air conditioning."

Christensen said users are demanding better network management as they rely more on hubs to anchor multiple LANs and to house related networking modules, such as bridges, routers and terminal servers.

Hub vendors have responded to customer demand and competitive pressures by rolling out network management products and detailing plans at a fast and furious pace in recent months.

In March, SynOptics Communications boosted the Simple Network Management Protocol capabilities of its Ethernet hub and unveiled a distributed net management architecture.

Ungermann-Bass rolled out its personal computer-based NetDirector system in January. NetDirector currently can be used to manage only UB Access/One hubs. When UB makes available SNMP support and a topological map application within the next two months, however, users will also be able to manage third-party devices with the system.

Chipcom, based in Southborough, Mass., this week will reveal a new net management system for its ONline System Concentrators called the ONline Network Control System. Dave Fowler, Chipcom's vice-president of marketing, declined to reveal details about the net management system but acknowledged that Chipcom will support SNMP.

"Everyone's moving from proprietary protocols to the point where SNMP is a checkoff item," he said. "There is also a move to workstation support to manage and monitor all the hubs on a network."

Crediting his own company for upping the ante in the intelligent hub net management game, Benson claims Cabletron has the most robust network management strategy of all hub vendors. Spectrum, which costs between $50,000 and $150,000, incorporates artificial intelligence technology and operates as a standalone system.

Industry observers said Cabletron's approach to network management is different from many of its rivals'. Cabletron has chosen to play among the likes of AT&T, with its Accumaster Integrator, and IBM, with its NetView, by positioning Spectrum as an integrated management product.

Hub vendors highlight net management

Sept. 1990	Cabletron Systems, Inc. announces Spectrum, a Unix-based management system that can monitor and control devices from Cabletron and vendors supporting SNMP.
Jan. 1991	Ungermann-Bass, Inc. delivers NetDirector, an OS/2-based network management system for its Access/One intelligent hub and modules.
March 1991	SynOptics Communications, Inc. introduces a distributed network management architecture, anchored by its new LattisNet Model 3040 Network Control Engine, that processes raw network data at intermediate management sites.
May 1991	Chipcom Corp. announces a new network management system, dubbed the ONline Network Control System, to be available this summer. The net management system is designed to run on Intel Corp. 80486 and 80386 microcomputers and Unix-based workstations, and to support SNMP.

SNMP = Simple Network Management Protocol

GRAPHIC BY SUSAN J. CHAMPENEY

Most other hub vendors have chosen to focus primarily on LAN management, leaving overall network management to the system vendors and products such as Accumaster Integrator and NetView, observers said. They've also been more inclined to team up with other vendors to gain network management support, they said.

"We'll handle the management of the physical LAN environment," said Mitch Strobin, product marketing manager for network management at SynOptics. "For more complex management applications involving the top four layers of the OSI stack, SynOptics has chosen to partner with other vendors and work with systems such as NetView and Sun Microsystems, Inc.'s SunNet Manager."

Most hub vendors have chosen to position their network management systems as mid-level managers, taking information from element managers and feeding it up to umbrella integrated net management systems.

"Users have acquired a large set of element management consoles they'd like to consolidate," said Roger Bertman, Ungermann-Bass' vice-president of marketing. "SNMP has established a foundation upon which element management systems can be brought together at a single point."

"The hub is the logical part of your network from which to manage the various elements of your LAN," Strobin added. ◘

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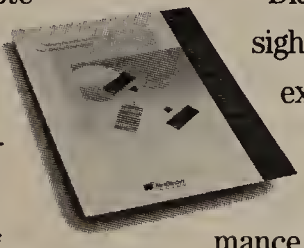

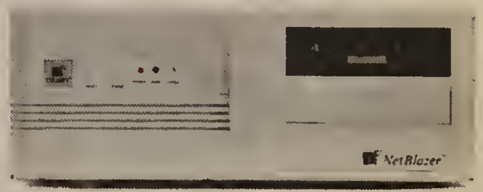

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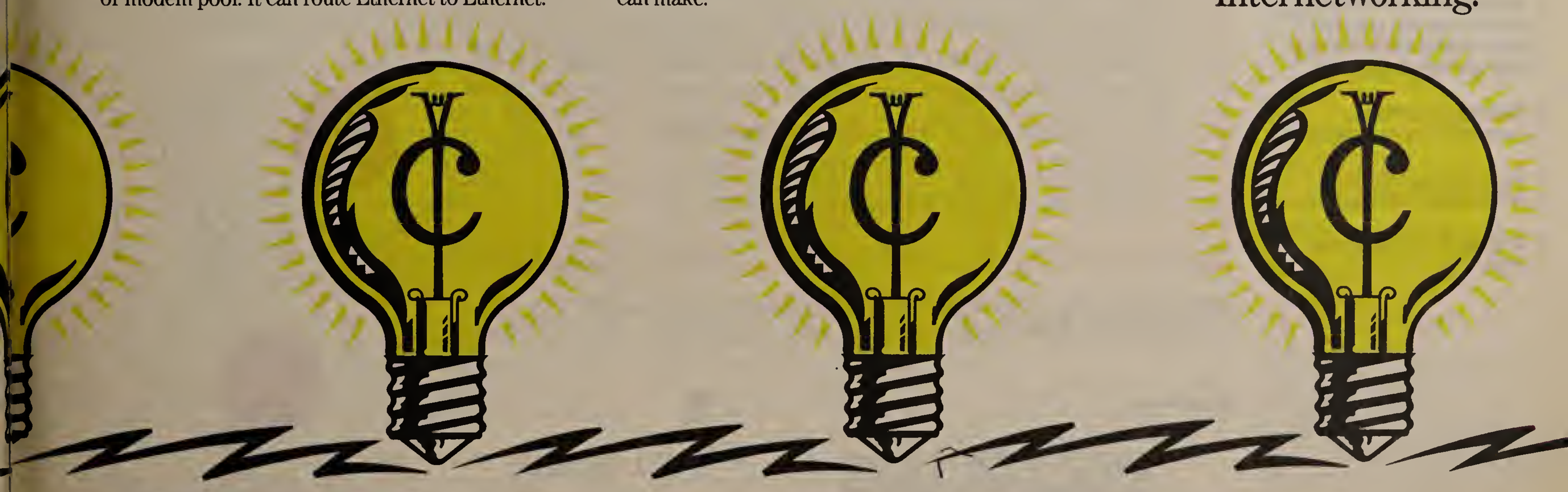

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Users moving to faster EDI

continued from page 1

is too slow and cumbersome to support accelerating trading requirements.

The ANSI X12 committee and the United Nations' EDI for Administration, Commerce and Transport (EDIFACT) committee, both of which are EDI standards-setting bodies, boast active task groups that are developing standards to support interactive EDI, which, unlike fast-batch EDI, needs new control mechanisms to support real-time communications.

In addition, a score of vendors, including IBM and Sterling Software, Inc., have rolled out new software and network services to support faster forms of EDI.

Give me real-time EDI

According to users who rely on EDI to support just-in-time manufacturing, accelerating the EDI process is critical to their business success.

"If I had it to do over again, I would implement real-time EDI from day one," said Frank Beier, EDI project manager at Owens-Corning Fiberglas Corp. in Toledo, Ohio.

The problem with store-and-forward or traditional batch processing for EDI is that as a company adds trading partners and increases the volume of message sets, batch jobs begin to conflict with one another. As a result, time-sensitive EDI messages, such as ship notices, may be delayed because the EDI translator is busy processing a large batch job, Beier said.

To avoid that problem, Owens-Corning plans to process all EDI documents in real time by year end, he said. The firm currently has 200 trading partners with whom it exchanges 14 different EDI message sets.

The firm's ultimate goal is to send out EDI messages and receive responses from trading partners within 45 seconds, according to Beier. This requires Owens-Corning's trading partners to be equipped to support fast-batch EDI, although most are not.

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To support fast-batch or interactive EDI, companies typically need to upgrade their communications and application software and more closely coordinate communications with trading partners and VANs. For many, this can be a prohibitively costly proposition.

The Chrysler comedown

Chrysler Corp. has been using fast-batch EDI since 1988 to receive advance ship notices from more than 2,000 suppliers. The suppliers dial into Chrysler's Tandem Computers, Inc. fault-tolerant processors, which are ready to receive incoming messages 24 hours a day, 365 days a year.

Chrysler uses fast-batch EDI because some of its suppliers are located next to its plants. This means the supplier could deliver parts before Chrysler received a shipment notice and had the chance to verify its contents and alert appropriate personnel.

Now, as a rule, Chrysler expects to process ship notices in 15 minutes or less.

Unlike fast-batch systems offered by VAN providers, Chrysler uses interactive links when communicating with suppliers. The dial-up link stays open until the supplier transmits the ship notice and Chrysler responds, verifying that the message's contents are accurate.

VANs typically relay a fast-batch EDI message from a sender's computer system to a receiver's without establishing a direct connection.

Ironically, Chrysler views fast-batch as a step down from a proprietary EDI system it used during the 1970s and most of the 1980s.

That system was fully interactive, but Chrysler scrapped it when it migrated to ANSI X12 EDI standards, which are based on store-and-forward processes.

In 1987, Chrysler submitted a proposal to ANSI X12 to establish methods for conducting interactive EDI using X12 standards. As a result, the X12 committee established the Interactive EDI Task Group, whose meetings have been attended by about 60 individuals representing more than 40 companies.

According to Tony Dutra, an independent EDI consultant based in Jamaica Plain, Mass., and chairman of the Interactive EDI Task Group, the committee will propose an interactive EDI standard, dubbed Application Exchange, to the X12C subcommittee this summer. If X12C approves the standard, it will present it to the X12 membership for final approval.

The standard specifies control codes used in a peer-to-peer EDI transmission that would signal when one trading partner has finished transmitting data and is ready to receive data in return, Dutra said. Trading partners could be linked via leased lines or a VAN, bypassing all mailboxes.

Users would have to modify applications to provide an immediate response to incoming messages and would need to modify the way their communications program interacts with their translation software, Dutra said. Otherwise, users would utilize the same X12 messages to send and receive data.

EDIFACT joins the fray

A parallel effort to establish interactive EDI standards in the EDIFACT community has been under way for several years. The driving force behind this effort has been the airline industry, which wants a standard way of communicating with other companies in the travel industry, including hotels, car rental agencies and tour operators.

Like Chrysler, the computer reservation systems owned by the major airlines already use proprietary systems and networks that enable them to book passenger reservations on other airlines in real time. But those proprietary systems make it difficult to expand the scope of the reservation network to include companies in other industries, said Kendra Martin, manager of airline industry data automation at the Air Transport Association of America (ATA) in Washington, D.C.

The Interactive EDIFACT Working Group, established last September, is considering a proposal for an interactive EDI architecture submitted by a joint working committee of ATA and the International Air Transport Association (IATA). This architecture would enable users to interactively exchange a series of short messages based on EDIFACT standards when booking a reservation.

Several U.S. carriers, including American Airlines, Inc. and Delta Air Lines, Inc., last fall announced they had begun using EDIFACT rules and syntax — but not actual EDIFACT messages — to interactively exchange reservation data.

Based on work done by the ATA/IATA interactive EDI committee, the service allows carriers to tap directly into one another's seat inventories in order to book guaranteed reservations.

The natural gas industry recently completed a seven-month pilot in which it tested the feasibility of using fast-batch EDI to coordinate transactions among producers, marketers, pipeline operators and retailers involved in moving natural gas from the ground to consumers.

Ten companies participated in the pilot, including Chevron Corp., Enron Corp., Mobil Corp. and Southern California Gas Co.

Changes in the spot price of natural gas can bring in new orders from retailers that need to communicate quickly with all the parties involved in producing and distributing natural gas, according to Gary Gannon, director of system planning and business analysis at Northern Natural Gas Co., a subsidiary of Enron. Natural disasters or other events that affect supply also require swift communications to sort out the logistics of fulfilling orders.

Companies participating in the pilot exchanged X12 messages modified for the gas industry using fast-batch services from one or more VAN providers, including AT&T, GE Information Services, IBM, Kleinschmidt, Inc. and Sears Communications Network, Inc.

Despite being on multiple public networks, the participating companies were able to send messages and receive responses in less than four minutes, Gannon said.

"Fast-batch EDI is the solution to the industry's operational and administrative problems," he said.

Senior Editor Bob Brown contributed to this story.

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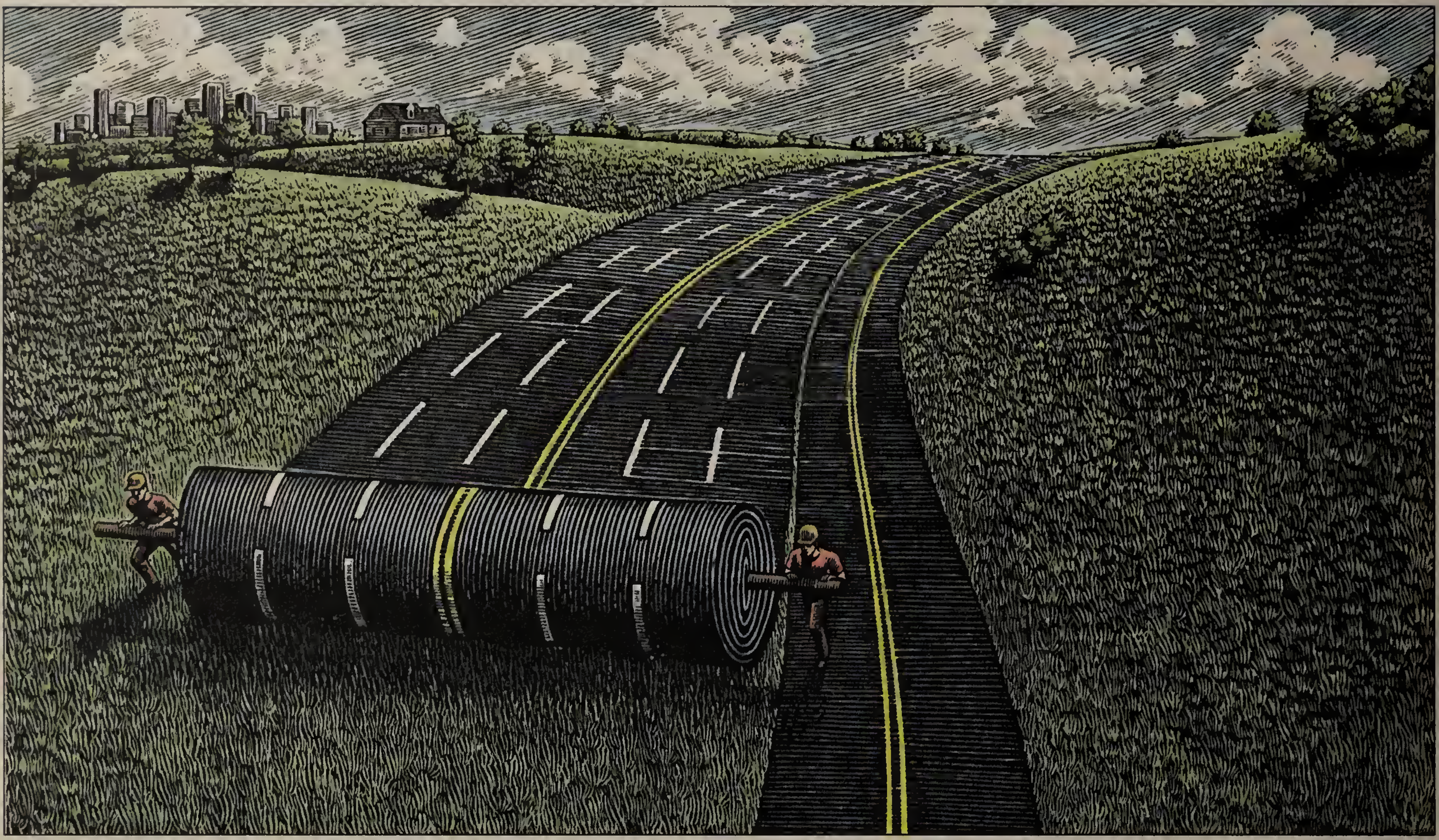

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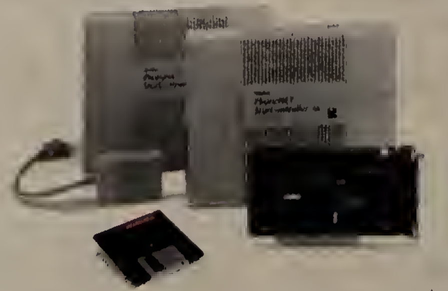

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